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# Construction

## Methods and Equipment

McGraw-Hill Publishing  
Company, Inc.  
TECHNOLOGY DEPT.

November, 1938

Price  
20 Cents

### Selection, Use and Care of Small Tools

By GEORGE E. DEATHERAGE  
Construction Engineer

★

### How to Select and Use Wrenches

★

### Nickel Alloy Steels for Hand Tools

★

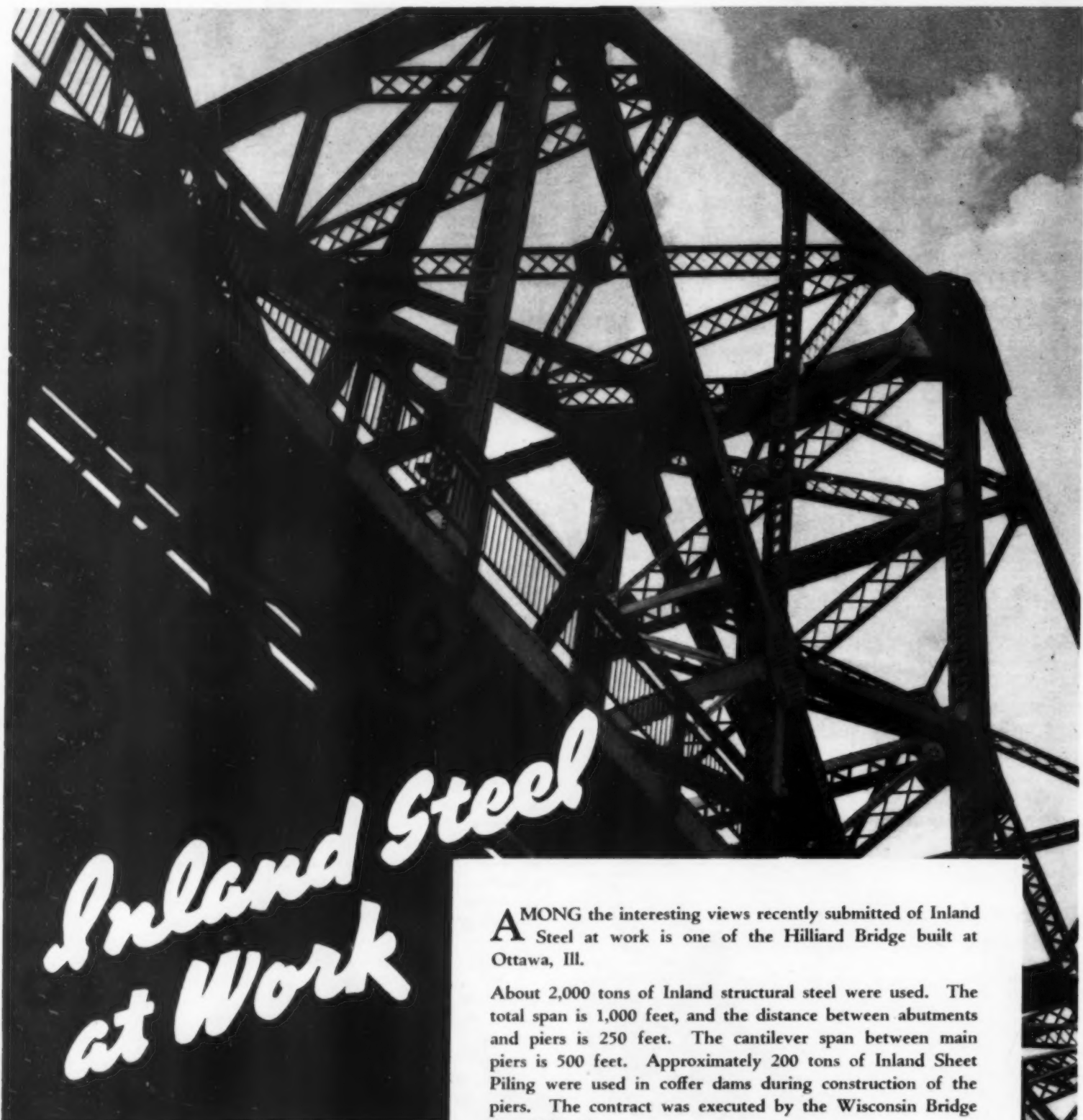
### Small Tools on Highway Jobs

AN ISSUE DEVOTED TO:

## SMALL TOOLS ON CONSTRUCTION

With scores of photographs illustrating a wide range of on-the-job applications.





# Inland Steel at Work

**A**MONG the interesting views recently submitted of Inland Steel at work is one of the Hilliard Bridge built at Ottawa, Ill.

About 2,000 tons of Inland structural steel were used. The total span is 1,000 feet, and the distance between abutments and piers is 250 feet. The cantilever span between main piers is 500 feet. Approximately 200 tons of Inland Sheet Piling were used in coffer dams during construction of the piers. The contract was executed by the Wisconsin Bridge Co., Milwaukee.

In addition to supplying the steel for such projects, Inland provides useful engineering assistance which often enables architect, fabricator and contractor to make important savings, both in time and costs.

Of great importance to contractor and fabricator are the promptness and dependability of service—the effective follow-through of Inland's mill men until the job is completed.

## INLAND STEEL CO.

38 South Dearborn Street, CHICAGO • District Offices: DETROIT • KANSAS CITY • MILWAUKEE • ST. LOUIS • ST. PAUL

SHEETS STRIP TIN PLATE BARS PLATES FLOOR PLATES STRUCTURALS PILING RAILS TRACK ACCESSORIES REINFORCING BARS

CONSTRUCTION Methods and Equipment — November, 1938

TECHNOLOGY DEPT

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# CURRENT JOBS

... and Who's Doing Them

## BUILDINGS

**Public**—Superstructure contract for third unit of Red Hook housing project in Brooklyn, N. Y., went to **George A. Fuller Co.**, of New York City, for \$7,243,000. Work has started on a \$3,000,000 court house building in Philadelphia, Pa., with the award of a foundation contract to **John McShain, Inc.**, of Philadelphia. For the Lakeview housing project in Buffalo, N. Y., **John W. Cowper Co.**, of Buffalo, was low bidder with a price of \$1,780,000. The **Virginia Engineering Co.**, of Newport News, Va., bid in for \$1,849,540 project for Naval barracks at Norfolk, Va. Foundations for the new Criminal Courts building in New York City, will be constructed by **L. P. O'Connor, Inc.**, of New York, for \$1,735,000. A new \$1,100,000 school, for which foundation contract was awarded to **Daniel Cunningham Construction Co., Inc.**, of Boston, will be built in Gloucester, Mass. For a senior high school in Washington, D. C., **Jeffress-Dyer, Inc.**, of Washington, received contract amounting to \$1,326,950. For the Board of Education, New York City, **J. Weinstein & Rubin Building Corp.**, of New York, will erect a \$1,313,240 Needle Trades high school. A \$900,000 college auditorium project in Oberlin, Ohio, went to **R. C. Mahon Co.**, of Detroit. A bid of \$738,000 obtained for **Turner Construction Co.**, of New York City, contract for hospital building at Central Islip, N. Y. Foundation contract for Queensbridge housing development in Long Island City, N. Y., was awarded to **Corbetta Construction Co.**, of New York, for \$636,700. In Pawtucket, R. I., **E. P. Turgeon** will build a \$551,986 high school. For a high school in Kansas City, Kan., the low bidder was **S. Patti Construction Co.**, with a tender of \$678,146. Power plant structures for Central Nebraska Public Power & Irrigation Dist., are under construction, at price of \$511,155, by **W. J. Assenmacher**, of Lincoln, Neb. **M. H. Golden**, was successful bidder with price of \$660,220, for Naval Base barracks in San Diego, Calif. High school addition in Detroit was awarded to **Patterson Engineering Co.**, of Detroit, for \$633,000. A school administration building to cost \$544,940 is under way in Pittsburgh, Pa., by **E. Crump, Jr.**, of Pittsburgh. Contract for new state office building in Annapolis, Md., was awarded to **Davis Construction Co.**, of Baltimore, for \$585,000.

**Commercial**—General contract for housing project involving 19 two-story buildings in Indianapolis, Ind., went to **E. A. Carson**, of Indianapolis, for \$1,680,000. A \$3,000,000 office building of 15 stories at Rockefeller Center, N. Y., will be built by **Hegeman Harris Co.**, of New York. In Abington Township, Pa., 400 houses, to be known as Fox Chase Manor, will be built for \$2,000,000, by **Joshua M. Holmes, Jr.**, of Baederwood, Pa. At cost of \$1,350,-

000, **Moss Bros.**, of Jamaica, N. Y., will build in that locality 270 one- and two-story dwellings. Contract for \$1,200,000 housing project in Plainfield, N. J., went to **J. L. Cornman**, of Brooklyn, N. Y. A \$1,000,000 apartment in Jackson Heights, N. Y., was bid in by **G. A. Fuller Co.**, of New York City. **Walter Butler Co.**, of St. Paul, Minn., has contracted to build in that city a \$1,500,000 project of 2- and 3-story apartment buildings. In Houston, Tex., 12-story apartment to cost \$900,000 is being built by **D. Hall**, local contractor.

**Industrial**—For a machine shop at Everett, Mass., for the Boston Elevated Railway, successful bid of \$1,250,000 was submitted by **James Stewart & Co.**, of Boston. In Somerville, N. Y., factory building contract was awarded to **The Austin Co.**, of New York City, for \$750,000. Addition to camera works of Eastman Kodak Co., at Rochester, N. Y., will cost \$500,000, according to successful bid of **A. W. Hopeman & Sons**.

## WATERWORKS

For 13½ mi. of 51 in. welded steel pipe for Metropolitan Water District, Los Angeles, Calif., bid of \$1,090,736 obtained contract for **Emaco Derrick & Equipment Co.**, of Los Angeles. Metropolitan District Water Supply Commission of Boston, Mass., awarded contracts aggregating \$469,975 to **C. & R. Construction Co.**, of Roslindale, Mass., for clearing site of Quabbin reservoir. **Arute Bros., Inc.**, of New Britain, Conn., were successful bidders on a water purification plant at Providence, R. I., to cost \$478,585. The city of Rock Island, Ill., awarded contracts as follows: \$246,990 for reservoir, to **Priester Construction Co.**, of Davenport, Ia.; \$204,750 to **H. W. Horst Co.**, of Rock Island, for water main. City waterworks improvements at Jacksonville, Ill., are under way by **Missouri Engineering & Contracting Co.**, of St. Louis, for \$360,936. Evansville, Ind., has engaged **A. G. Ryan & Son**, local contractor, to make water-works improvements costing \$384,967.

## SEWERS

Sewer construction in Brooklyn, N. Y., will be done by **Tomasetti Contracting Co.**, of Brooklyn, for \$607,211. Pittsburgh, Pa., awarded \$573,581 sewer contract to **M. Manella**, local contractor. Concrete storm water sewer at Gross Pointe Park, Mich., to cost \$548,131, has been started by **Gargaro Co.**, of Detroit. A \$290,446 sewage disposal plant will be built in Albuquerque, N. Mex., by **Bradbury & Marchant**, of Albuquerque. Successful bidders for sewage disposal works in Trenton, N. J., were **Karno Smith Co.**, of Trenton, with price of \$353,951.

# Construction

## Methods and Equipment

Copyright, 1938

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H. W. CLARKE, Vice-President

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A McGRAW-HILL PUBLICATION

## Small Tools ON CONSTRUCTION

IT is customary to think of present-day construction largely in terms of heavy equipment. The man in the street, watching a contractor's crew at work, has eyes only for the big power shovel scooping up its loads of earth and, with a skillful operator at the controls, depositing them speedily and accurately within the body of a huge motor truck. The crane, setting steel for a building or the cableway depositing concrete for a dam are also subjects that appeal strongly to the construction gallery. From the viewpoint of the spectator, at least, heavy equipment "steals the show."

But any one familiar with construction realizes that, while heavy machinery plays a vital and spectacular role, there are scores of other operations, just as essential to the successful completion of the job, that require the use of lighter equipment, involving nothing spectacular or dramatic in its daily use. In the wake of the heavy earth moving, concreting and steel erection activities of any job follow a host of other operations opening up endless opportunities for the application of small tools. In this category may be listed boring, drilling, sawing, cutting, bolting, grinding, surfacing, pipe threading, jacking, hoisting, pushing, pulling, twisting, hammering—to name only a few.

Here, then, is the field for small tools. Both in mechanical types, such as the portable electric or pneumatic saw or drill, and in the strictly hand-tool classification, such as wrenches, the makers of this equipment have introduced improvements and refinements in design and in materials which open up endless opportunities of profitable use in the field of construction.

This issue of *CONSTRUCTION Methods and Equipment*, therefore, is designed to indicate, by specific examples, the wide range of useful, time-saving and cost-cutting applications which small tools offer to the construction man.

## BRIDGES

Low bidder for 5,560 ft. bridge at Tacoma, Wash., was combination consisting of **Pacific Bridge Co.**, of San Francisco, **General Construction Co.**, of Seattle and **Columbia Construction Co.**, of Bonneville, Ore., with price of \$5,949,730. At Cleveland, Ohio, **S. W. Emerson Co.**, of Cleveland, will build approach to Main Ave. bridge for \$1,-

270,332. Ten river piers for Raritan River bridge, in Middlesex County, N. J., will be constructed by **P. F. Connolly**, of Long Island City, N. Y., for \$1,157,657. Grade crossing elimination contract at Woodbridge, N. J., to cost \$871,924, went to **James Stewart & Co.**, of New York City. Bridge at Beaufort, S. C., was bid in by **Tide-water Construction Co.**, of Gloucester Point, Va., for \$482,182.

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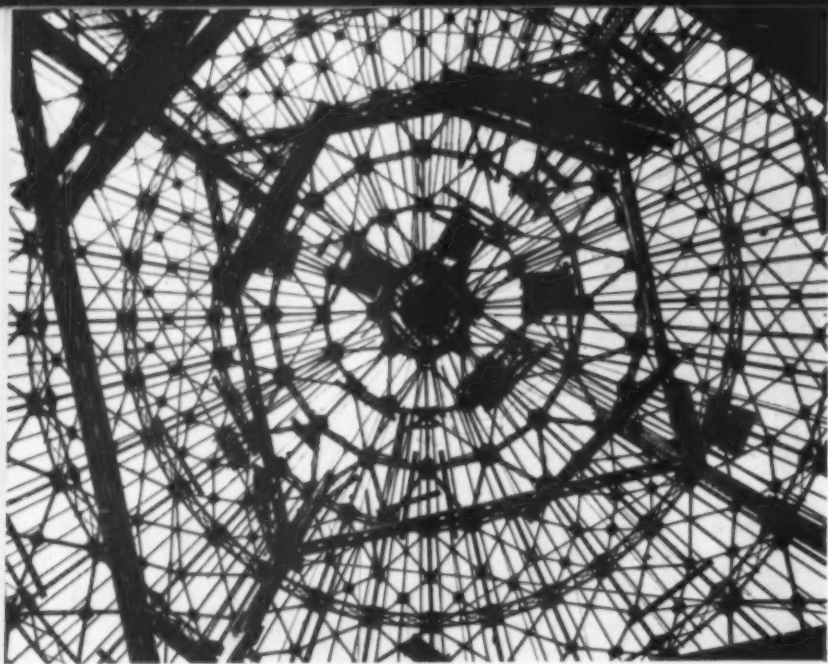
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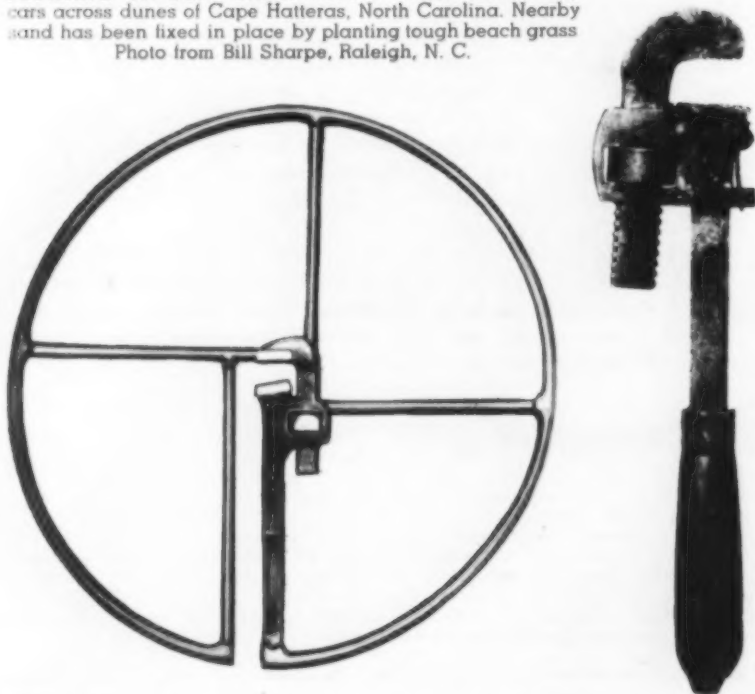
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**SPIDERWEB OF STEEL** bisects skyward gaze of visitor inside 200-ft.-diameter Perisphere at New York World's Fair. Meridian trusses of steel skeleton weighing 2,000 tons frame into cylindrical drum at top of structure. Temporary steel tower, used to support two derricks during erection, is being dismantled.



**FLOATING ON SOFT SAND.** wooden wheel tracks carry cars across dunes of Cape Hatteras, North Carolina. Nearby sand has been fixed in place by planting tough beach grass. Photo from Bill Sharpe, Raleigh, N. C.



**SAFETY WHEEL WRENCH** made by a Wyoming machine company to design of a western oil company for use on sucker rods incorporates Walco wrench having forged steel handle which permits welding to wheel. **ORIGINAL STILLSON WRENCH** (above, right), believed to be one of the first thousand Stillsons manufactured by Walworth Co. under royalty arrangement with its mechanic, Daniel C. Stillson, served for years as inventor's own wrench but is still in excellent condition. To original features patented in 1869 Stillson added back spring patented in 1872.

# JOB ODDITIES

A MONTHLY PAGE OF

*Unusual Features of  
Construction*



**TO OPEN NEW FIELDS** for astronomical study, huge observatory housing 200-in. telescope, largest in world, is completed by California Institute of Technology on Mount Palomar, 6,100 ft. above sea level, 130 mi. southeast of Los Angeles. Ford trucks, after transporting 1,000 tons of concrete materials up steep, brush-covered cattle roads to summit, now are aiding in construction of modern highway climbing mountain's rugged slopes.



"Don't you think your public would rather see you operate your shovel, Mr. Feidelbaum?"



# 'SLEEPING POWDER'

## "'INCOR'S A SURE CURE FOR SLEEPLESS NIGHTS WORRYING OVER FROST-DAMAGED CONCRETE'"

**T**O SAVE money and take the worry out of cold-weather concreting, eleven years' experience says: "Use 'Incor' 24-Hour Cement."

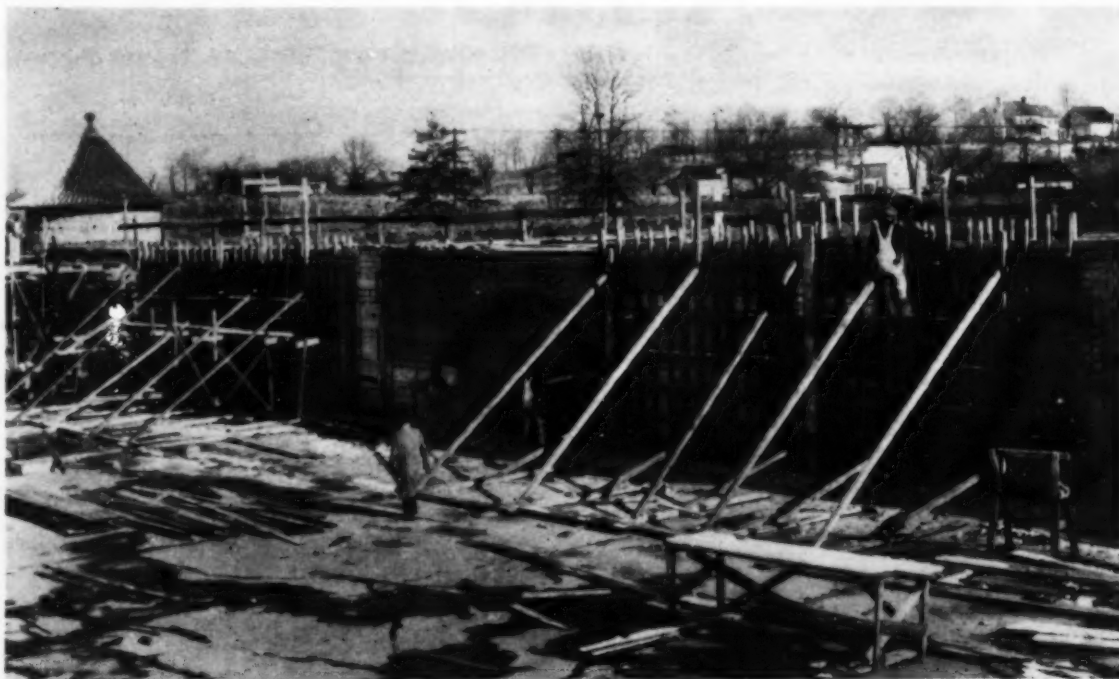
Through basic processing improvements, 'Incor' cures or hardens in one-fifth the usual time. Result:

1. Heat-protection costs 60 to 70 per cent lower;
2. Cold-wave hazard reduced to hours, instead of days; less worry in cold-weather work;

3. Form re-use is speeded up — one form-set does the work of several;

4. Summer schedules maintained, even in dead of Winter — labor lay-offs minimized.

Figure these economies on work now in progress. Take advantage of 'Incor'\* savings on cold-weather work. Write for copy of "Cold-Weather Concreting." Lone Star Cement Corporation, Room 2271, 342 Madison Avenue, New York. \*Reg. U. S. Pat. Off.



*Concreted in the snow, air temperature 25°, dividing wall in Ardsley, N. Y., reservoir of New Rochelle Water Co. was completed in 22 days. Cuzzi Bros., Mt. Vernon, N. Y., contractors, obtained strong, dense, water-tight concrete and secured frost-damage protection at reduced expense.*

## LONE STAR CEMENT CORPORATION

MAKERS OF LONE STAR CEMENT . . . 'INCOR' 24-HOUR CEMENT

# NOW

NORTHWEST

GEO. J. BOCK CO.  
PHONE  
HOLLYWOOD 36-49  
LOS ANGELES  
CALIF.

## NORTHWEST SHOVEL OUTPUT *with* TRUCK MOBILITY



**N**ORTHWEST shovels because of Northwest advantages have long been known for their high output. Now you can have a Northwest shovel on truck mounting.

This means the Northwest Welded Boom and Dipper Sticks. The Northwest Independent Crowd with its extra digging power, the Cushion Clutch, the "feather-touch" Clutch Control, Uniform Pressure Swing Clutches and all the Northwest refinements that mean longer life and more profitable operation—cast steel bases, splined shafting, ball or roller bearings on all high speed shafts—a Northwest shovel with truck mobility!

### NORTHWEST ENGINEERING COMPANY

1728 Steger Building  
28 E. Jackson Blvd.  
Chicago, Illinois

If you have the problem of handling many small jobs in a short period of time or handling a large job involving long moves, the Northwest Truck Shovel is the answer. Let us send you a bulletin.





**John E. Ballenger Construction Co.**  
GENERAL CONTRACTORS

LAKELAND, FLORIDA

August 23, 1938

Mr. J. W. Grass, Sales Manager  
Southern Tractor & Equipment Co.  
Atlanta, Georgia

Dear Mr. Grass:

We have received your inquiry of August 17th in reference to the use of the Euclid Trac-Trucks on our grading Federal Aid Project 175-H, Polk County, on U. S. Road 19.

As you know, we are using three of these 10-yard Euclid Trac-Truck units on this work. The character of excavation on this Project, which is 5.8 miles in length, ranges from heavy loam soil to ball-bearing sand.

The operation of these Trac-Trucks has been very satisfactory as a versatile unit in the handling of this excavation, and they have proven exceptionally satisfactory in hauling over the high scrub sand soil, where, to my mind, it would be very impractical and entail a very high cost to transport the excavation over this sand by truck operation, or by any other of the heavier units moving dirt, due to a free hauling provision of one mile which is provided in the Special Provisions of the Specifications.

Under the contract, we are required to top off the entire grade with three inches of sand clay stabilizer, and it is our intention to haul the entire quantity with the Euclid Trac-Trucks, which I think will be even more satisfactory on this operation than any unit we have available for construction work.

In conclusion, the operation of these units have been more than satisfactory, and I am glad to take this opportunity to recommend their use on similar operations.

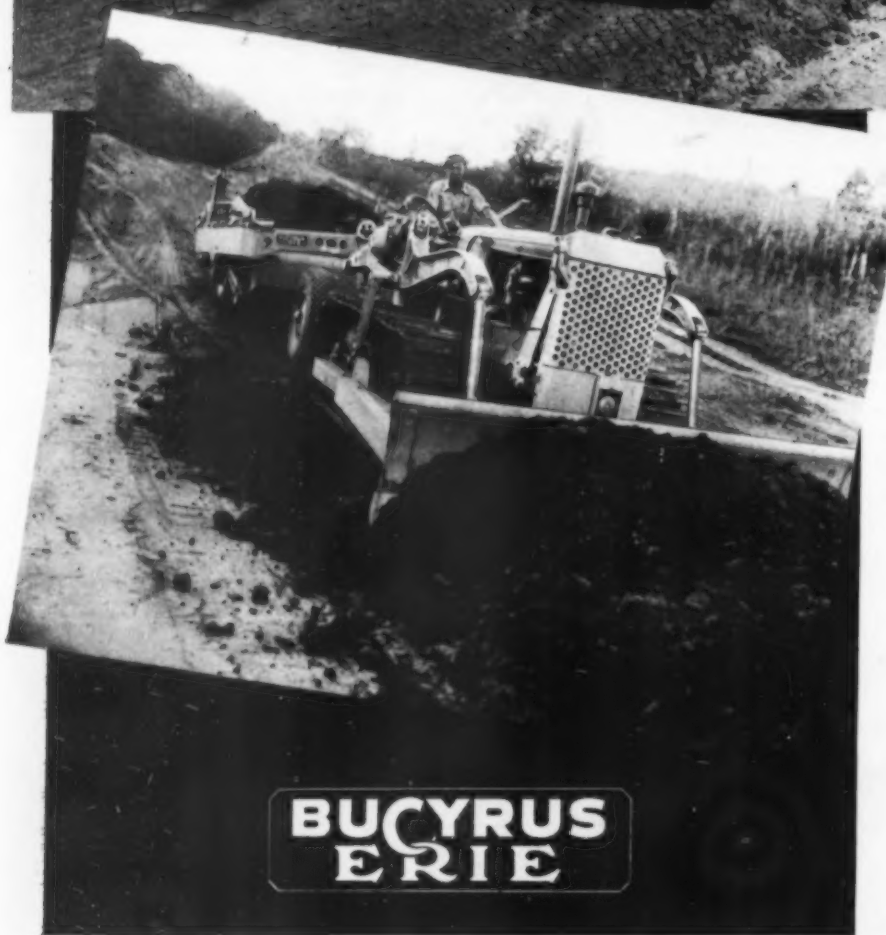
Yours very truly,

JOHN E. BALLENGER CONSTRUCTION CO.

By *Chas. M. Nolan*

Chas. M. Nolan  
General Superintendent

# GRADING A ROAD, *Single-handed*



ONE MAN, the tractor operator, handles the full range of dirt-moving on a road job—from blazing the trail to completing the grade—when his tractor has a Bucyrus-Erie Scraper hitched to its drawbar and a Bucyrus-Erie Bullgrader mounted in front. On the job illustrated here, a front-end oil pump mounting furnishes hydraulic power for the Bullgrader blade, and a drum winch at the rear of the tractor powers the single cable that controls the 4-Wheel Scraper. In dual service with the Scraper, the Bullgrader levels fills, maintains hauling roads and finishes grades. The blade may be angled to the right or left for smooth, accurate grading, or set straight across for bulldozing. Write for complete details on Bucyrus-Erie's modern tractor equipment, or see your nearest International Industrial dealer.

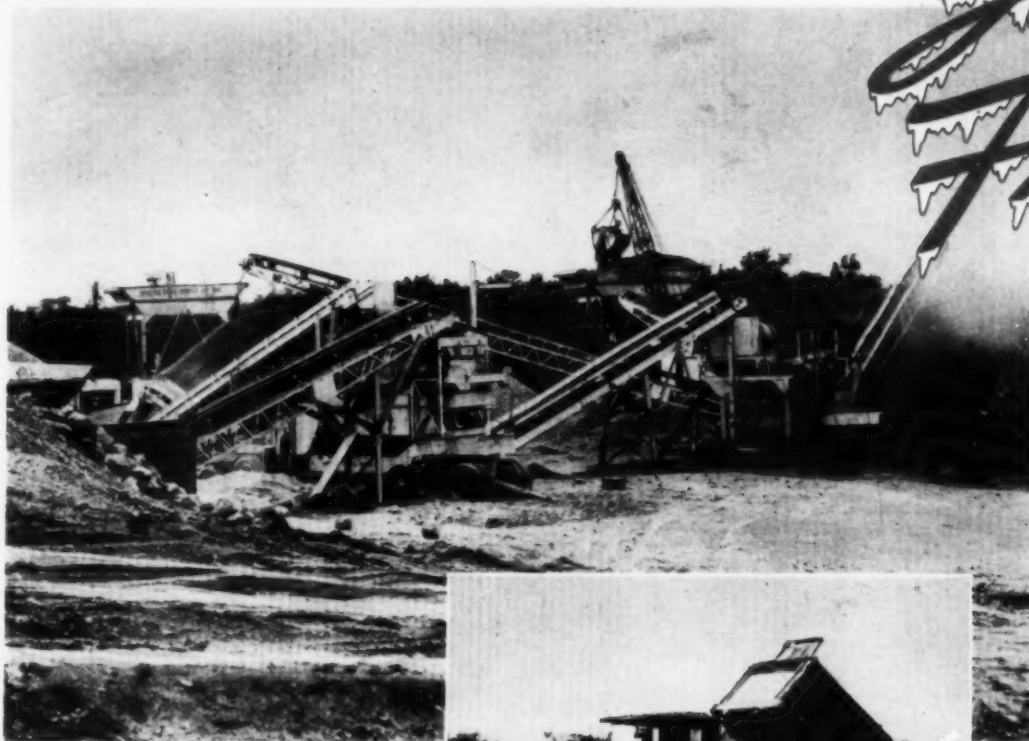
**BUCYRUS  
ERIE**

**BUCYRUS - ERIE**  
SOUTH MILWAUKEE, WISCONSIN, U. S. A.



# SPEEDS ROAD-JOB TO BEAT

# Jack Frost



Plant of Koepke Construction Company, Appleton, Wisconsin, set up along Highway 22.

To service the 9 trucks and other engines on this job, 750 gals. of Fire-Chief had to be hauled 28 miles, and arrive before 5 A.M. each day.



Map of Wisconsin showing Green Bay section of Lake Michigan where Texaco helped contractor to beat early freeze-up.

UP IN THE GREEN BAY COUNTRY, Old Man Winter gets on the job in early fall.

With 8 miles of road building ahead of them, the Koepke Construction Company just had to keep the job going . . . or get frozen in for the winter.

They put it up to Texaco to keep their equipment going, and Texaco came through.

All cranes, shovels, pavers, trucks, trac-

tors, crushers, screening plant were lubricated with Texaco Marfak and other Texaco Lubricants. In fact, the job was Texaco fueled and lubricated 100%.

When you want complete service, come to Texaco. Lubrication engineers will aid you make a sound selection and 2186 warehouses assure prompt deliveries.

The Texas Company, 135 East 42nd Street, New York City.



ROCK DRILL BOOKLET. Texaco's latest contribution to the care and lubrication of rock drills. 36 pages. Write for your copy.



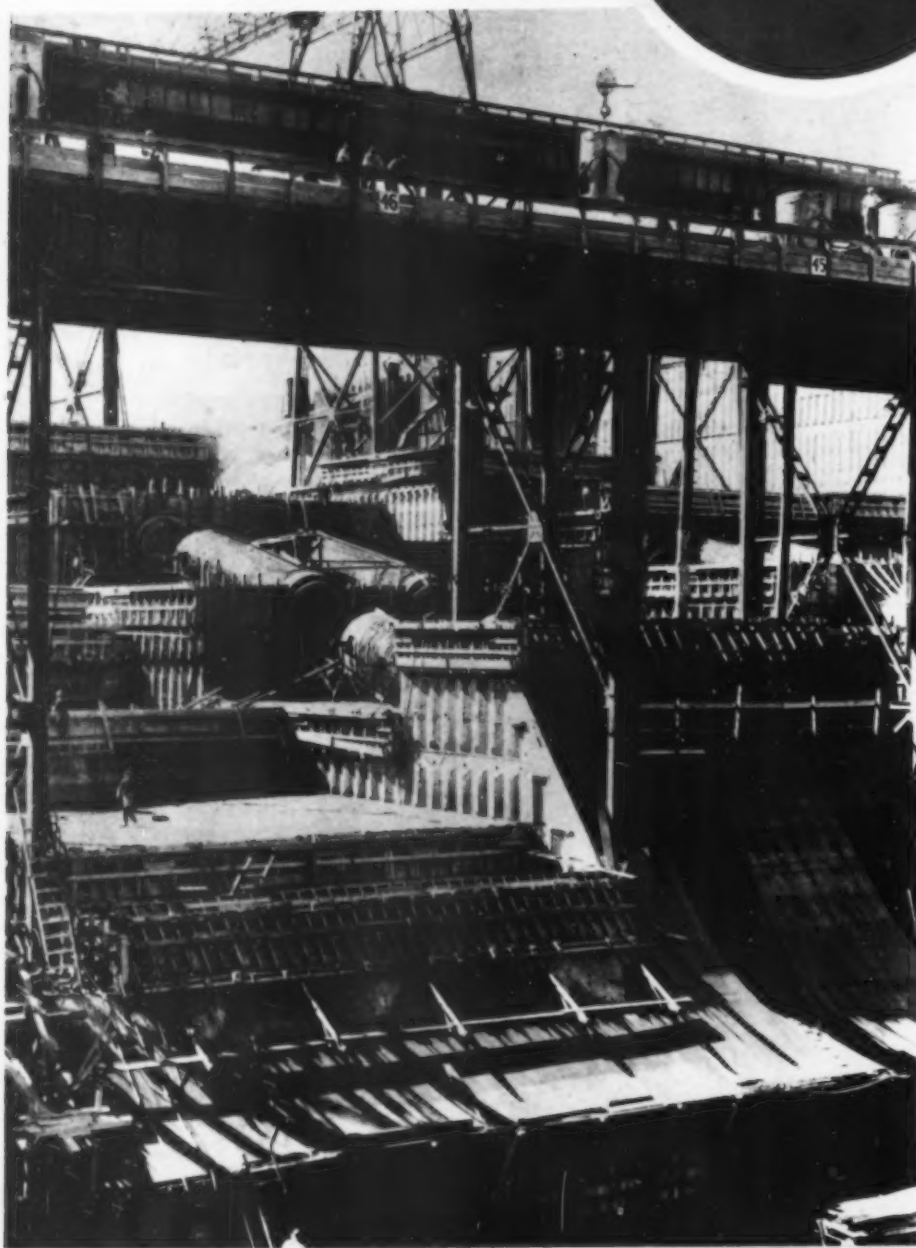
# TEXACO MARFAK

# HARNESSING

**550,000  
CU. FT. PER SEC.  
OF  
RAGING RIVER**

**WITH THE AID OF**

**ALLOY  
NICKEL  
STEELS**



More exciting than a Wild West Round-up is this taming of the Columbia River where it races seaward at a rate of 550,000 cu. ft. per sec.

Harnessing the Columbia at Grand Coulee, Wash., is the largest engineering feat ever undertaken. This dam, more than  $\frac{4}{5}$  of a mile across and more than  $\frac{1}{10}$  of a mile high, contains *three times more concrete* than Boulder Dam. On every hard job, Nickel plays an important role.

Lifting materials 550' above bedrock required in hoisting machinery the extra strength of SAE 2330  $3\frac{1}{2}\%$  Nickel steel, tested to 100,000 p. s. i. Other vital parts of hoisting equipment were forged from SAE 3140 Nickel-chromium steel, tested to 105,000 p. s. i.

For the battery of 17' paradox gates and bulkhead section ring follower gate leaves, cast Nickel steel was selected to withstand pressure, erosion and wear. With double annealing, this 1% Nickel cast steel had to withstand a  $120^\circ$  bend and show a tensile strength of 80,000 p. s. i. SAE 3240 Nickel-chromium steel was used for stems in paradox gate hoists. For stem extension caps, wedge and jaw pins, case hardened SAE 2315  $3\frac{1}{2}\%$  Nickel alloy steel was specified.

**THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL ST., NEW YORK, N. Y.**



# ONE AMERICAN FAITH

*that has remained unchanged...*



... UNDER 10 ADMINISTRATIONS

**F**AR back in the 80's...when Grover Cleveland was serving his first term as President . . . American industry learned to repose its ignition faith in the ancestors of the American Bosch Super-Powered Magneto.

For over 50 years this noble line of magnetos has continued to justify the faith of men who design or use gasoline engines...for digging roads or drilling wells...building bridges or pumping oil . . . driving tractors or hauling trucks.

Put *your* ignition faith in the pedigreed American Bosch Magneto and solve your ignition problems once and for all.

**AMERICAN BOSCH CORPORATION**  
SPRINGFIELD, MASS.

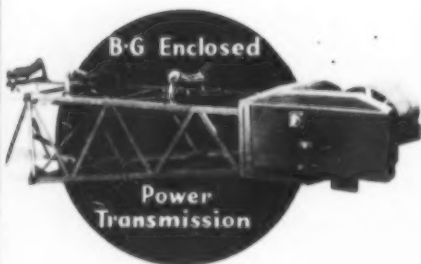


# AMERICAN BOSCH

*Super Powered* **MAGNETO**



# Via Barber-Greene



B-G Standardized Units include 24" and 42" deep Steel Truss, Enclosed Power Transmissions, Head End Drives, Wrap Drives, Various Types of Take-Ups, A Frames, Walkways, etc. All unit parts and assemblies are accurately rated, giving the individuality of a "tailor made" conveyor plus the many additional advantages of standardization.



**B**ELT CONVEYORS offer by far the cheapest means of handling bulk materials. Barber-Greene offer many additional advantages.

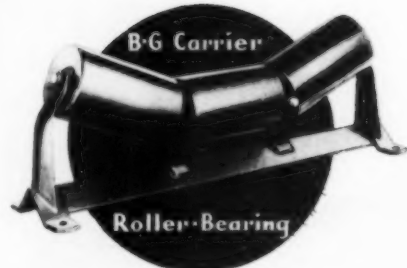
Having Pre-Engineered Standardized Unit Parts and Assemblies, the B-G Sales Engineer is able to make a quicker, more accurate price estimate, the Engineering Department is able to make a quicker, more practical layout.

This B-G Standardization lets us carry the parts in stock for practically any conveyor requirement — giving prompt shipment.

Erection is tremendously speeded up and simplified, and perfect alignment is assured.

B-G Standardization allows the addition of standard accessories later, and Barber-Greene Standardized Sectional Construction permits unequalled change of set-up to meet changing conditions.

Our business is solving your material handling problems the most economical way.



B-G Carriers are recognized for their excellent design and performance records. They are available with plain, ball, or roller bearings. If you are replacing carriers or erecting your own conveyor, investigate B-G Carriers.

Standardized Material-Handling Machines

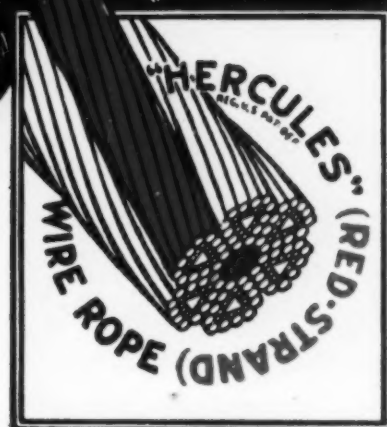
## BARBER GREENE

530 West Park Ave.  
Aurora, Illinois

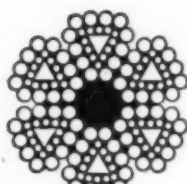


# Toughness

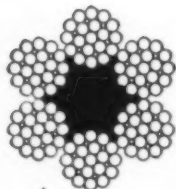
plus  
STRENGTH  
ELASTICITY  
FLEXIBILITY  
DURABILITY



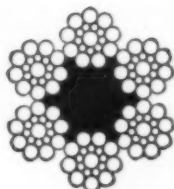
## All Perfectly BALANCED



Style B  
Flattened Strand



6x19  
Filler Wire



6x19  
Seale

A heavy duty wire rope must be tough enough to take plenty of punishment . . . round after round and still come back for more.

All "HERCULES" (Red-Strand) Wire Rope is tough . . . as tough as wire rope can be made without sacrificing those other equally vital factors of strength . . . elasticity . . . flexibility and durability. It is the balance of these characteristics that enables "HERCULES" to win the decision for you in your battle to reduce operating costs.

For best performance and real economy you need this balanced wire rope. Specify it for your next job.

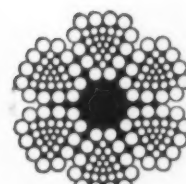
*In order to be suitable for all conditions, "HERCULES" (Red Strand) Wire Rope is made in a wide range of both Round Strand and Flattened Strand constructions—all of which can be furnished either Standard or Preformed.*

Made Only By **A. Leschen & Sons Rope Co.** Established 1857

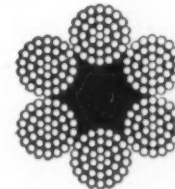
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Chicago . . . . . 810 W. Wash. Blvd.  
Denver . . . . . 1554 Wazee Street

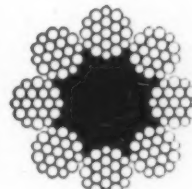
San Francisco . . . . 520 Fourth Street  
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"G"  
Flattened Strand



6x37  
Extra Flexible



8x19  
Extra Flexible

**"We use GULF'S higher quality lubricants... and keep this dredge in continuous low-cost operation 24 hours a day" . . . . SAYS THE CAPTAIN**



"Our oil temperatures are remarkably low," says this dredge Captain, consulting with the Gulf engineer in the picture above regarding his lubrication.

**"The  
Gulf Engineer  
gave us  
the *Right*  
Recommendations"**



The 510 HP Diesel which drives the pumps and the 150 HP Diesel which drives the generator for auxiliary power are both protected with Gulf Parvis Oil and Gulf HM grease, applied as recommended by this Gulf engineer.



Gulf Lubcote, a tough, tenacious lubricant which clings to metal surfaces, is widely used for gear lubrication. This special petroleum product combines high adhesiveness for metal surfaces with efficient lubricating qualities.

"**W**E figure that a breakdown on this dredge would cost us \$35.00 an hour," says this Captain. "That is why we have standardized on Gulf's higher quality lubricants. They help us operate twenty-four hours a day without shutdowns for adjustments or repairs."

Whether you are operating a \$100,000 dredge or a small Diesel tractor, a Gulf engineer can help you insure continuous trouble-free service and low maintenance expense. He has had broad experience with the lubrication of all types of contracting equipment and is prepared to recommend the proper application of oils and greases exactly suited to your equipment.

The Gulf line includes more than 400 different lubricants, and Gulf's wide distribution from Maine to Texas insures prompt delivery of the petroleum products you need — no matter where your job is located. Talk with the Gulf engineer when he calls.

## **GULF OIL CORPORATION GULF REFINING COMPANY**

GENERAL OFFICES: GULF BUILDING, PITTSBURGH, PA.



**ALSO A COMPLETE LINE OF FUEL AND FURNACE OILS**



Harrison bought  
for the

TOUGHEST JOB



ROOTER  
DID AWAY  
WITH MOST  
BLASTING



ANGLE-  
DOZER DID  
THE HEAVY  
CLEARING

... he got it... and the PROFITS

Not all of the state of Pennsylvania is made up of shale rock. Harrison Construction Company, of Pittsburgh, had used their LeTourneau fleet to win bids on many a job that called for fine finishing... in loam... clay... and ordinary materials. But to look at their U. S. Highway 22 realignment job, near Armagh, you'd get the impression Pennsylvania was a stone quarry. Half the yardage is solid rock... 57,000 yards of it. But Harrison was prepared... with a complete set of LeTourneau tools... veterans of other profits, all.

First, a Heavy Duty Rooter pioneered the cuts, with but one tooth, ripped the shale into workable chunks. Only the largest boulders necessitated blasting... others were dug out with the powerful, high lift of the rugged Angledozer blade. Then four Carryalls, behind "Caterpillar" D8's, came into action. Full tractor power was applied to the cutting edge, as the blades bit into the broken slabs with a *natural* suction that crowded the bowls full. Despite this stubborn digging, the Carryalls averaged 7 pay yards of rock each load, and more than 8 in soil and clay. At the fill, dumping was accomplished in ordinary "dirt time". A touch of the Cable Control lever instantly forced all rock from the bowl by the positive ejection tailgate (an exclusive Carryall feature). That's moving rock *dirt cheap!*

Years' experience as a LeTourneau fleet user had long before job-proved the profits to Harrison... for here is performance and stamina to go in and lick the toughest-going today's contracting has to offer... and come out with a profit *every time*. Your "Caterpillar" dealer will back all claims with a LeTourneau demonstration right on your own job... You figure the savings!

LETOURNEAU

R. G. LeTOURNEAU, INC.

PEORIA, ILLINOIS Cable Address: "BOBLETORNO" STOCKTON, CALIFORNIA

Manufacturers of: Angledozer\*, Huggies\*, Bulldozers, Carryall\*, Scrapers, Cranes, Drag Scrapers, Power Control Units, Rooters\*, Treedozer\*,

# A DEPENDABLE SERVICE

*goes with this  
Dependable Product*



**W**HEN you order USS Concrete Reinforcing Bars you can count on prompt delivery of a product that is of top quality. The facilities of our distributors are conveniently located to give you quick service, and full stocks of standard sizes and lengths are carried to meet your immediate needs.

All USS Concrete Reinforcing Bars carry the Quality Mark of the Concrete Reinforcing Steel Institute. This symbol on Concrete Reinforcing

Bars is your assurance that the bars meet the highest standards in the industry. They are rolled from new billet steel, and are a product of domestic manufacture.

Our service is complete. We are equipped to cut and bend USS Concrete Reinforcing Bars to your specifications wherever facilities may be inadequate. Specify USS Concrete Reinforcing Bars and avoid costly delays caused by slow and incomplete delivery of materials.



*Be sure that the Quality Symbol  
of the Concrete Reinforcing  
Steel Institute is on all Concrete  
Reinforcing Bars you buy.*

## U·S·S CONCRETE REINFORCING BARS

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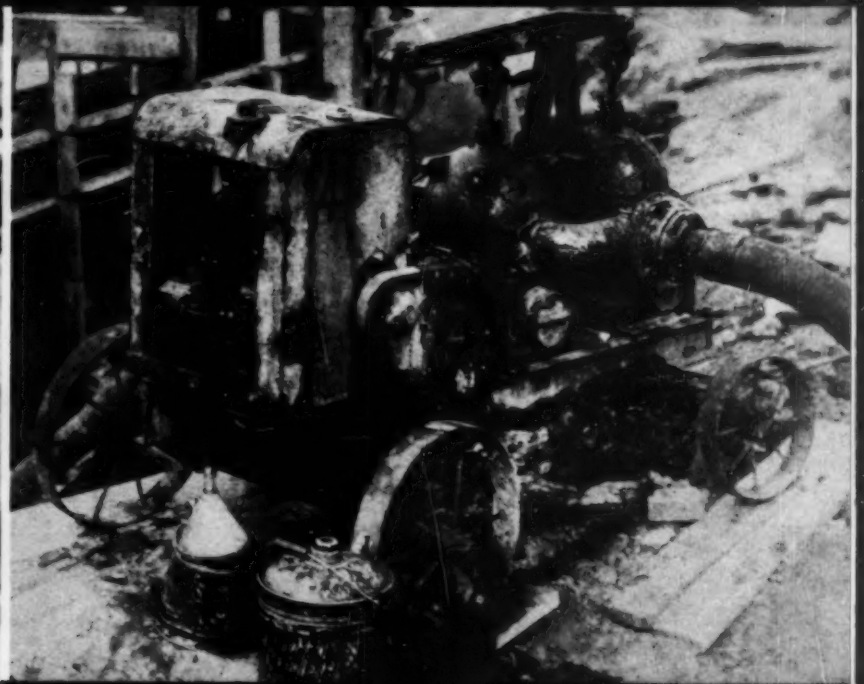
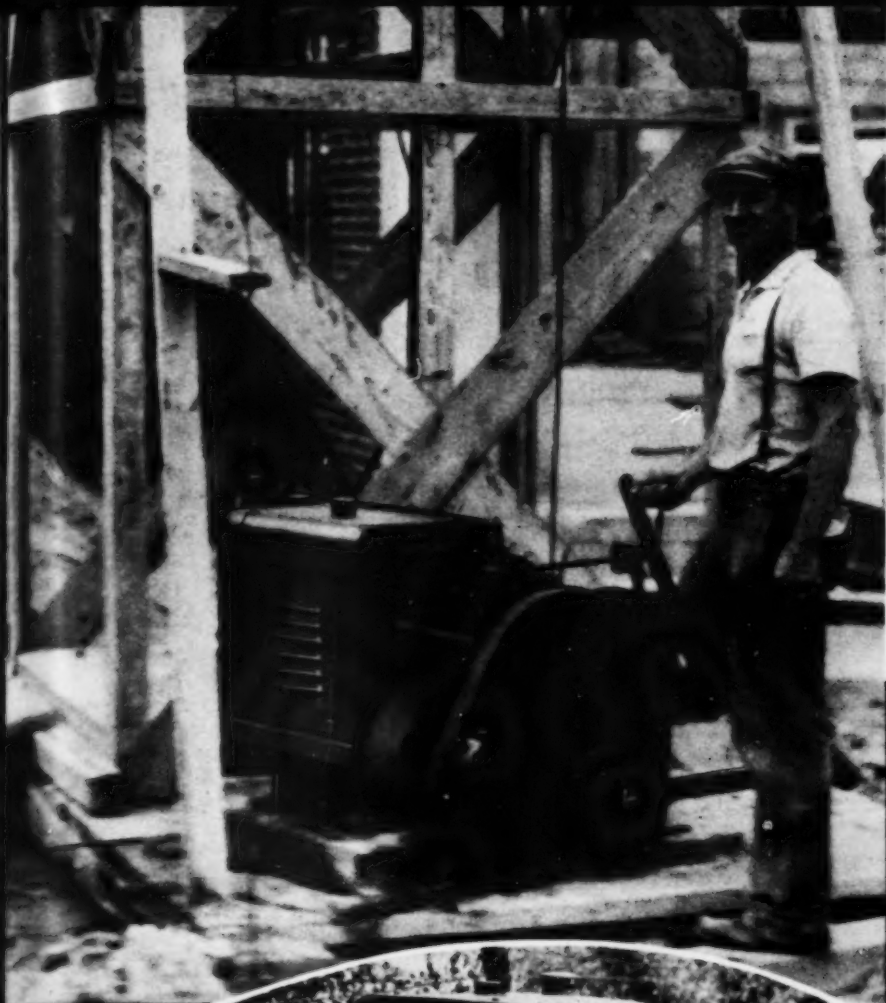
TENNESSEE COAL, IRON & RAILROAD COMPANY · Birmingham, Ala.



Columbia Steel Company, San Francisco, Pacific Coast Distributors · United States Steel Products Company, New York, Export Distributors

# UNITED STATES STEEL





(Above) A grizzled old veteran of many a pumping job is this 10 year old Novo double force diaphragm pump. Weeks and months of continuous operation on one job after another, handling water laden with debris. It's the old reliable, fool-proof, contractor's friend. Here, it is dewatering excavation for footings on river retaining wall.

(Left) Ask the Boss, he knows. Here is Keith Granger of the Dorr D. Granger Construction Co. operating the Novo NH, single drum hoist used on the new Lansing, Michigan, meat and produce market. "That hoist can take it," said Mr. Granger. "We bounce it around from one job to another, and it's always ready to go."

Send for information on the complete line of Novo Hoists, gasoline, electric, or Diesel powered.



## THOSE THAT HAVE The Jobs Are Using **NOVO**

Read the reasons why on the jobs  
shown here

(In oval) Pumping over a mile with a discharge head of 40' and a suction lift of 10', this Novo Pressure Pump (Model DU) is delivering approximately 3,000 GPH for drilling operations at Chase, Kansas. Pump owned by the Harbar Drilling Co. Novo has the most complete line of pressure pumps offered to the contractors. — Send for literature.

(Left). When the pumping got too heavy for other pumps to handle, they rushed in this Novo 6" Self-Primer to dewater the coffer dam on this highway bridge job. The Novo pulled down the 18' of water so that pouring of concrete could start. Contractors were Frank & Stiehl of East Lansing, Michigan.

Send for literature on Novo equipment. There is a Novo Distributor in your locality ready to serve you.

**Send the Coupon**

# NOVO

**NOVO ENGINE CO., 214 Porter St., Lansing, Mich.**

Send information on the following Novo equipment.

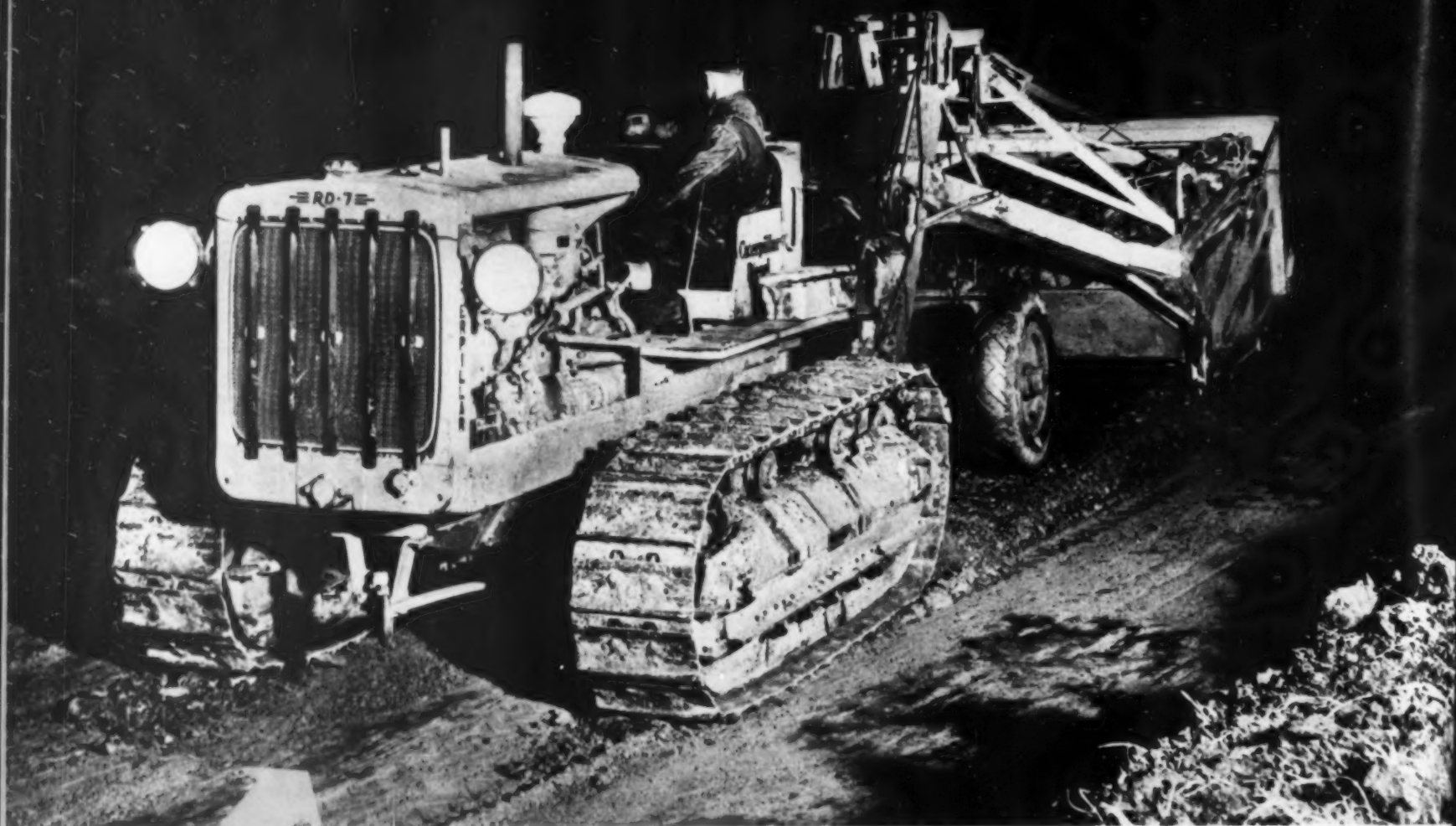
PUMPS, Self-Primers ☐ Diaphragm ☐ Pressure ☐  
HOISTS, Builders ☐ Dragline ☐

Name .....

Address .....

City ..... State .....

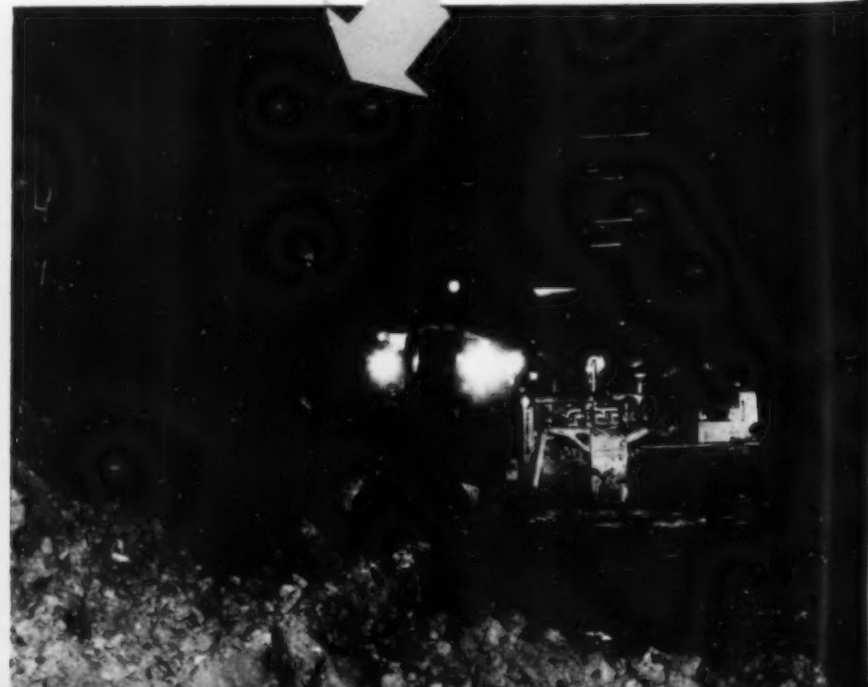
# TOUGH ENOUGH TO S



A "Caterpillar" Diesel D7 Tractor and LeTourneau Carryall stripping earth from vein of rock at a stone-quarry near Elmont, Kansas. Uses less than 3 gallons of 7 3/10c fuel an hour. Makes 16 trips an hour on a 400-foot haul. Pay-dirt loads on this night-and-day job average 5½ yards.

A LeTourneau bulldozer-equipped "Caterpillar" Diesel D8 photographed in the middle of the night as it works to add two feet to the top of a 27-mile levee, Tulare Lake, California. Operating 24 hours a day—with time-out only for lubrication—it consumes 4 gallons of 6c fuel an hour.

A "Caterpillar" Diesel D7 Tractor, with LaPlant-Choate roadbuilder. Not quite 24-hour operation, here. But its 20 hours out of every 24 make a busy schedule. Typical "Caterpillar" Diesel fuel-economy here—only 2 gallons of 7-cent fuel an hour.





# STAND 24-HOUR SHIFTS!



Another 24-hour-a-day job! This is a "Caterpillar" Diesel No. 11 Auto Patrol maintaining construction roads leading to the Municipal Airport at Dundalk, Maryland . . . which is under construction.



**H**ERE are four pieces of "Caterpillar" Diesel equipment working from dawn to dusk . . . then back to dawn again! And these machines are tough enough to push or pull their loads around the clock, without requiring extra attention. All that a "Caterpillar" Diesel asks—and all that it needs—is fuel, grease, and occasional check-ups for wear-and-tear and adjustments. *That keeps it going!*

"Caterpillar" Diesels are built to make money for you. They do that with their economical use of inexpensive fuel—and with their ability to handle many different jobs. But, in addition, they have a ruggedness which you can employ 24 hours a day . . . and which you can preserve, for years of useful, efficient service, by a little reasonable care that *holds maintenance-costs to a minimum!*

# CATERPILLAR

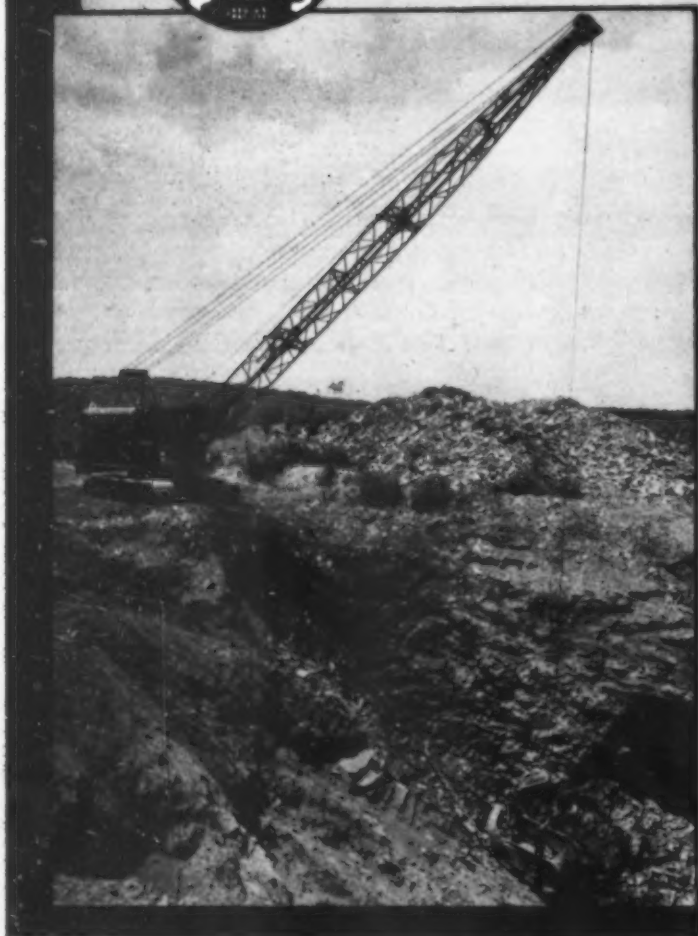
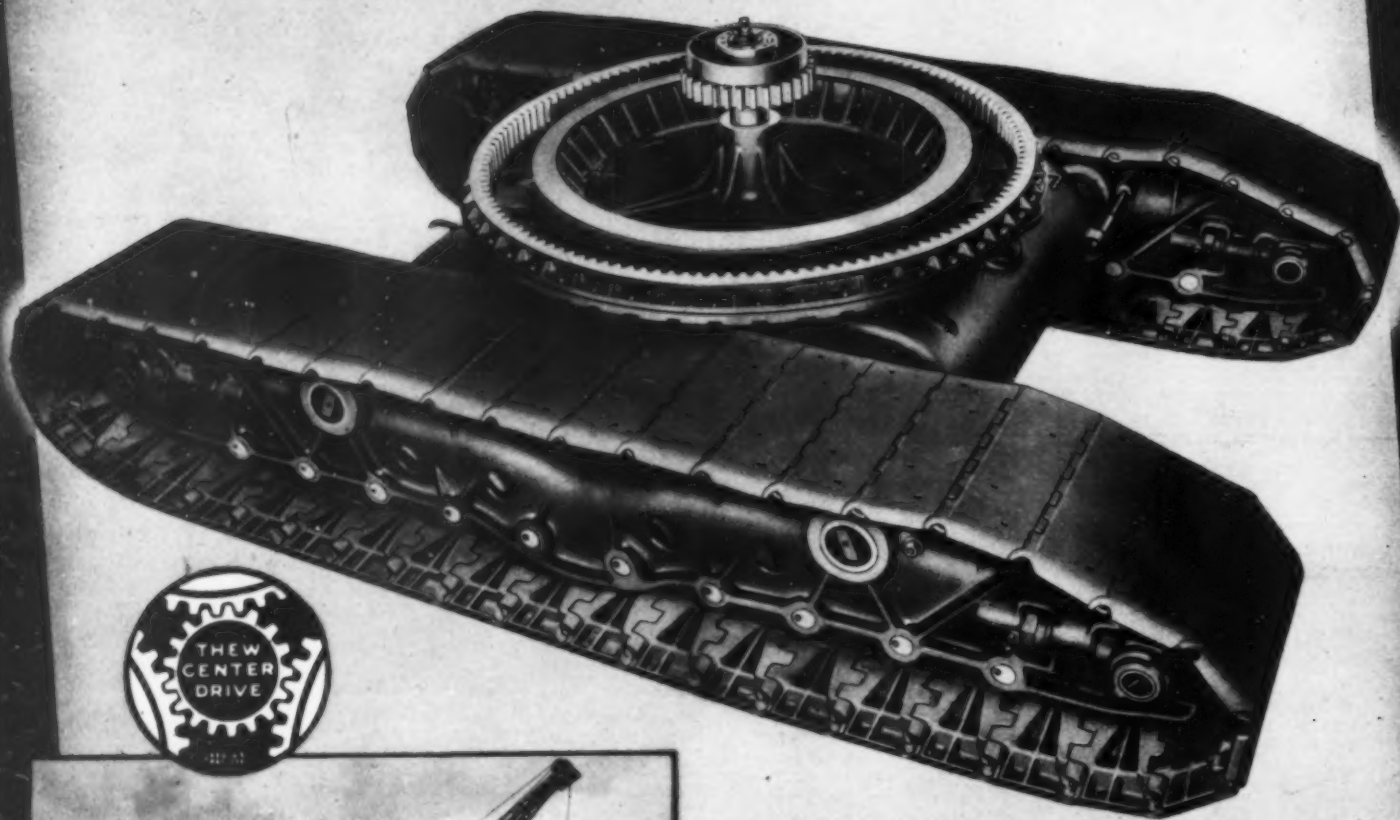
REG. U.S. PAT. OFF.

## TRACTOR CO., PEORIA, ILL.

DIESEL ENGINES • TRACK-TYPE TRACTORS • ROAD MACHINERY

# THIS CRAWLER ALONE

## Makes the LORAIN-95 an Outstanding Long-Range, Big-Capacity Dragline, Clamshell, 40-Ton Crane



• Here's a real crane and dragline base with excellent stability, low ground pressures—it's 18 ft. long, 12½ ft. wide—yet it ships completely on one car without dismantling.

• It has 2 travel speeds in both directions—it steers in either direction with the turntable in any swing position—here's a big crawler with all the ease of maneuverability of a ¼-yd. machine.

• It can travel simultaneously with hoisting and swinging operations.

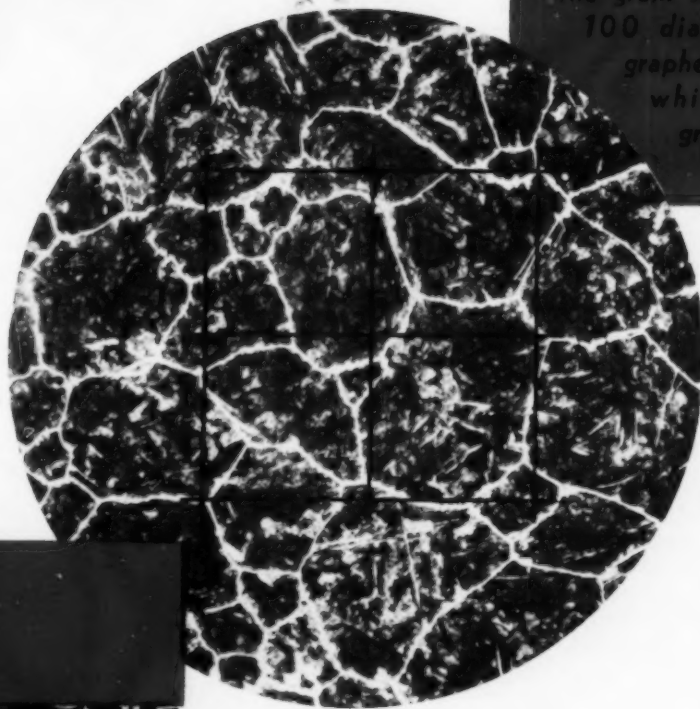
• It supports a Center Drive turntable with direct-to-the-point power application; with simplicity of design; with balanced minimum weight; with high gantry to save boom weight.

• From crawler tread pins to boom peak sheaves the Lorain-95 is built strictly as a crane, clamshell, dragline—you can't possibly buy a shovel boom for it. Catalog explaining this machine's many outstanding features is available on request.

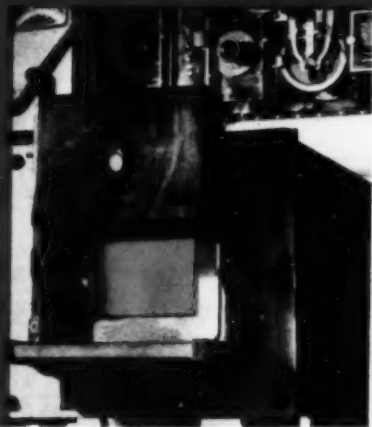
THE THEW SHOVEL CO. • LORAIN, OHIO

# LORAIN-95





The grain structure, magnified 100 diameters, is photographed through a screen which measures the grain size accurately.



The preparation of a sample for grain size measurement requires heating to a high temperature for several hours. Automatic electric control is used by Wickwire Spencer to assure accuracy of the test.

## MEASURING ROPE STEEL CRYSTALS IN THE RAW...

### BUILDING LIFE INTO WICKWIRE ROPE BEYOND SPECIFICATIONS

Wickwire Spencer pioneered the application of the study of grain size through a microscopic screen, to steel for wire rope. Armed with the knowledge of inherent grain size characteristics, Wickwire Spencer Engineers accurately plan the processing of the metal, not only producing thereby definite desired characteristics beyond specifications, but giving the rope wire unprecedented uniformity. Thus you, as a user of Wickwire Rope, can depend upon its long and satisfactory service.

# WICKWIRE ROPE

*It is still the privilege of the progressive manufacturer to build rope life into his product beyond official specifications.*

#### WICKWIRE SPENCER STEEL COMPANY

General Offices: 41 East 42nd Street, New York City; Sales Offices and Warehouses: Worcester, New York, Chicago, Buffalo, San Francisco, Los Angeles; Export Sales Dept.: New York City. WICKWIRE SPENCER SALES CORPORATION, New York, Chattanooga, Tulsa, Abilene, Texas, Portland, Seattle.

# KOEHRING



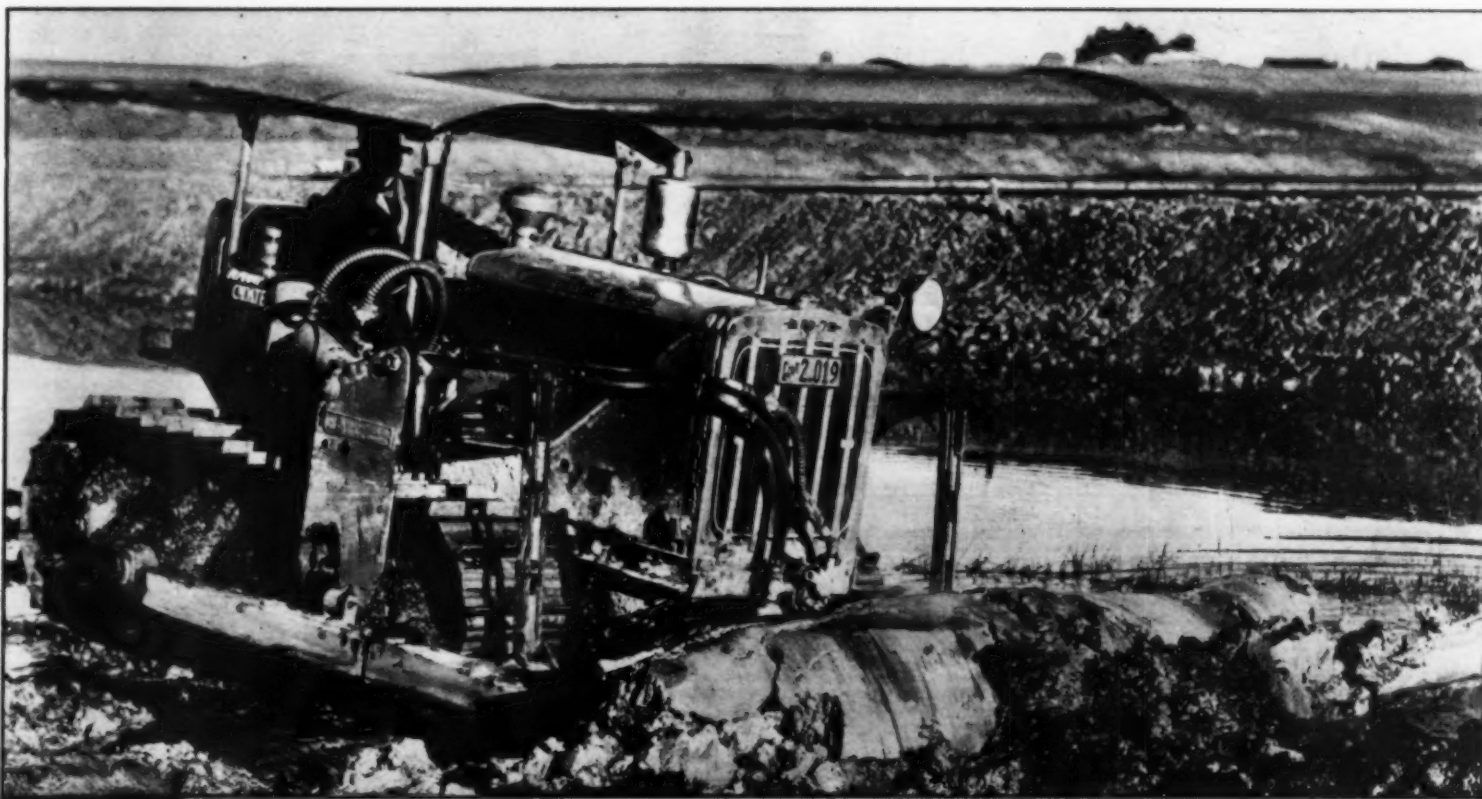
*Ten Trail-Dumps on this Ohio Levee Job.*

Dig and haul with Koehring—Use Koehring High Speed Excavators with Koehring hauling Equipment. Be sure of profits by using both. Slow excavators absorb your hauling profits and slow hauling equipment cramp the shovel production. Koehring equipment is fast, economical and steady in operation. Many leading contractors are insuring their profits with Koehring equipment.



**KOEHRING COMPANY**  
CONSTRUCTION EQUIPMENT • MILWAUKEE, WISCONSIN



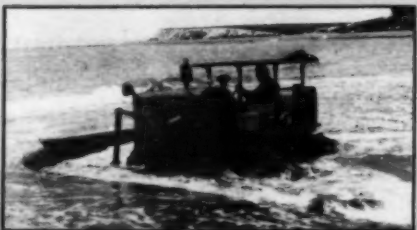


**Stop worrying about those Tough Jobs!**

**Famous the World Over  
for Doing Many Jobs  
Profitably . . .**



**Road building in Guam**



**Drainage Canal Work  
in New Zealand**



**Land Clearing in  
British East Africa**

**SNOW FLOWS  
TAMPING ROLLERS  
TREEDOZERS**

## **Let LAPLANT-CHOATE TRAILBUILDERS *Give You More Work at Lower Cost Per Yard Moved***

**H**ere's a single tool for cost-cutting performance on a wide range of jobs that would ordinarily require several separate pieces of earth-moving equipment. LaPlant-Choate Trailbuilders have the rugged strength to give you dependable operation in the heaviest service, and safe Finger-Tip Hydraulic Control for positive and accurate application of power.

You do more work in less time and do it better because simple, effortless hydraulic blade control operates instantly and accurately. It will not skip, bob, or hurdle obstacles because the blade can be locked rigidly in any position. Positive down pressure can be exerted on the blade for digging. LaPlant-Choate Trailbuilders push earth, rocks, timber; dig, clear land and remove stumps; level, fill, back-fill, and spread materials smoothly and evenly.

LaPlant-Choate Trailbuilders increase profits for you from the first rough cut to the final grading. Designed exclusively for use with "Caterpillar" Track-type Tractors, to assure a smooth-operating, properly balanced unit, and readily available service facilities. Upkeep costs and breakdown delays are less because of the unusual sturdiness of the design and the dependable Hydraulic pumps which carry a full year's guarantee.

You can tackle the toughest jobs with new confidence and greater assurance of profits when your equipment includes LaPlant-Choate Trailbuilders.

Get full details from your LaPlant-Choate and "Caterpillar" dealer. Write today for free literature on the complete line of LaPlant-Choate earth-moving equipment.

**LAPLANT-CHOATE**  
*MEANS*  
**Lower Costs**

**LAPLANT-CHOATE  
MANUFACTURING CO. Inc.**  
**CEDAR RAPIDS, IOWA.**

**BULLDOZERS  
BRUSH CUTTERS  
RUBBER WHEEL WAGONS  
CARRIMOR SCRAPERS**

# The Builder Figured the Savings in Advance—

**MUSEUM OF MODERN ART**  
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**Builder**  
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**Designing Engineer**  
George E. Strehan  
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New York City



## with LEHIGH EARLY STRENGTH CEMENT

**C**RAMPED working quarters—limited material storage space—and the need for quick completion of this six-story re-inforced concrete building—prompted the builder to investigate the advantages of quick service concrete.

Tests conducted on the job under the engineers' supervision showed that compared with normal portland cement the required strengths could be obtained in one-third the time by using Lehigh Early Strength Cement. This elimination of "waiting time" for normal concrete to harden to service strength made it possible to speed up the entire construction schedule.

Lehigh Early Strength Cement was used for all concrete work. Column forms were stripped in 24 hours; floor slab forms in as short a period as 48 hours. The re-use of forms effected a saving of one-third in form costs. Floors were quickly used for storage of materials—further construction was continued without interruption. This complete co-ordination meant savings in overhead, and expedited the entire job.

Lehigh Early Strength Cement offers advantages for any work where quick use of the concrete is desired. It is especially advantageous in cold weather. The quick curing to service strength reduces the hazards of freezing—expedites construction—and reduces heat-protection costs during curing period.

Consult the Lehigh Service Department for our specific information. Bulletin on concreting in cold weather sent on request.

**LEHIGH PORTLAND CEMENT COMPANY**

Allentown, Pa.

Chicago, Ill.

Spokane, Wash.





# Speed-o-Matic

SHOVEL - DRAGLINE - CRANE

## Listen to me

"I've been an operator since Hector was a pup and I know you can't help getting tired and slowing up at the end of a shift when you're throwing those back-breaking, mechanical hand levers. Speed-o-Matic is the operator's dream come true and it's going to mean bigger production and save a lot of time and money for the contractors who use it. It's 10 years ahead of the times. I'm for it 100%!"



## 36% Greater Yardage with Speed-o-Matic

Actual, on-the-job, figures prove that Speed-o-Matics work faster and handle easier than hand-lever machines. Capparell Stripping & Const. Co., Hazelton, Pa., secured 36% greater yardage with a Speed-o-Matic dragline than with a same size, hand-lever machine operating on the same job. There's positive proof, that the faster, easier operation of the short-throw hydraulic control levers of the Speed-o-Matic makes faster operation certain. If you want a big thrill — watch a Speed-o-Matic at work. Write us today and we'll tell you where you can see one!



Speed-o-Matic effortless control greatly reduces the effect of human fatigue on operating costs. The operator can achieve a faster rate of production and maintain it consistently throughout his shift.



### LINK-BELT COMPANY

300 West Pershing Road, Chicago. Distributors and Offices in Principal Cities

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# LINK-BELT



for **LOWEST COST PER GALLON**



\$75  
F.O.B.  
Factory

JAEGER BANTAM  
5700 G.P.H.  
Complete with En-  
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COMPACT 2" 3"  
4" 6" MODELS  
7,000 to 90,000  
G.P.H.



8" and 10" Pumps  
up to 220,000 G.P.H.



## Use JAEGER Sure Prime Pumps

Only in a Jaeger do you get the Patented Priming Jet for fastest known 100% automatic prime, Patented Lubri-Seal for long-life, perfect sealing, Patented Self-Cleaning Shell and Jaeger Open Impeller for handling dirty water in maximum volume, without clogging or a sign of wear, thru thousands of hours of heavy service. Jobs are safer, dewatering costs lower with a Jaeger. Get our Catalog and Prices.

THE JAEGER MACHINE CO.  
800 Dublin Ave., Columbus, Ohio

## JAEGER "TOUCH CONTROL" UTILITY HOISTS



—Up to 50 H.P. Loads  
Handled with  
a Finger-Tip

The Modern,  
Popular Priced Hoist  
—One, Two or Three Drum,  
Gas or Electric

### Get All These Advantages:

- 1—Giant Expanding Frictions or Clutches versus old, back-breaking cones!
- 2—Timken Self-Aligning Bearings!
- 3—Combined All-Steel Frames and Base—add drums as wanted!
- 4—Up to 8 cylinder power—Self Starter!
- 5—One size for 25 to 50 H.P.—simplified mass production—more hoist for less money!

SEND FOR NEW LOW PRICES.

The Jaeger Machine Co., 800 Dublin Ave., Columbus, O.

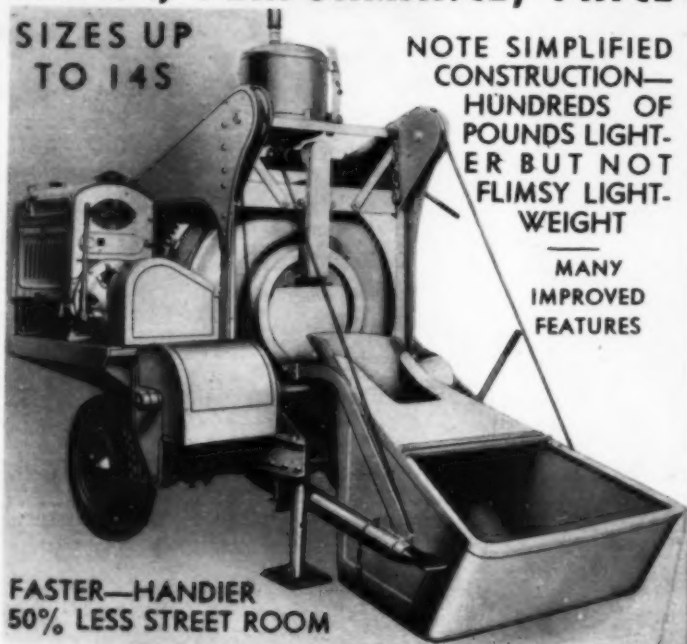
## Jaeger's LATEST SPEEDLINE END DISCHARGE TRAILERS

1939 TYPE, SENSATIONAL IN  
DESIGN, PERFORMANCE, PRICE

SIZES UP  
TO 145

NOTE SIMPLIFIED  
CONSTRUCTION—  
HUNDREDS OF  
POUNDS LIGHT-  
ER BUT NOT  
FLIMSY LIGHT-  
WEIGHT

MANY  
IMPROVED  
FEATURES



FASTER—HANDIER  
50% LESS STREET ROOM

### SAVE HUNDREDS OF DOLLARS ON YOUR SMALL MIXER

Pay about half the price of heavy  
55 Non-Tilt, get up to 40 cu. yds.  
a day of quality concrete—

### JAEGER "UTILITY" MIXER with MEASURING BATCH HOPPER

Fast as a costly Power Loader  
Machine—easy to move and trail.



### 2-WHEEL OR 4-WHEEL MOUNTINGS— INTERCHANGEABLE



SKIP SHAKER  
LOADER

AUTOMOTIVE  
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GET OUR  
NEW LOW  
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800 DUBLIN AVE. • • • COLUMBUS, OHIO



# Construction

## Methods and Equipment

Established  in 1919  
A McGRAW-HILL PUBLICATION

ROBERT K. TOMLIN, Editor

Volume 20

November, 1938

Number 11

## LIGHT TOOLS

### *Supplement Heavy Equipment in Maintaining Secondary Roads*

**T**O SIMPLIFY and improve the effectiveness of maintenance on secondary state roads in Pittsylvania County, Va., which forms one unit under the direction of a resident engineer in Virginia's state highway system, the Highway Department has divided the county into five areas, in each of which is stationed a permanent gang responsible for about 280 mi. of secondary roads. A gang comprises nine men adequately equipped with machines and tools to perform all maintenance and construction operations on secondary roads except bituminous surface treatment. Bituminous treatments are applied by a floating gang operating in the highway district of which the county is a part.



**TOOL SHED** at one of five equipment yards in county houses oil, grease and small tools necessary for operations of area maintenance crew on 280 mi. of secondary state roads.



**BRUSH HOOKS** (below) clear roadway bank for widening by tractor and blade grader.



**VOLUME PUMP**, used in field principally for greasing tractors and road graders, is here equipped with truck fittings for demonstration by W. M. HODGES, maintenance and construction foreman.

**RESPIRATOR** (left) protects operator of broom and blower unit used to clean dust and dirt from surface of soil road prior to applying prime coat of bituminous surface treatment.



*This Month's*

# "NEWS REEL"

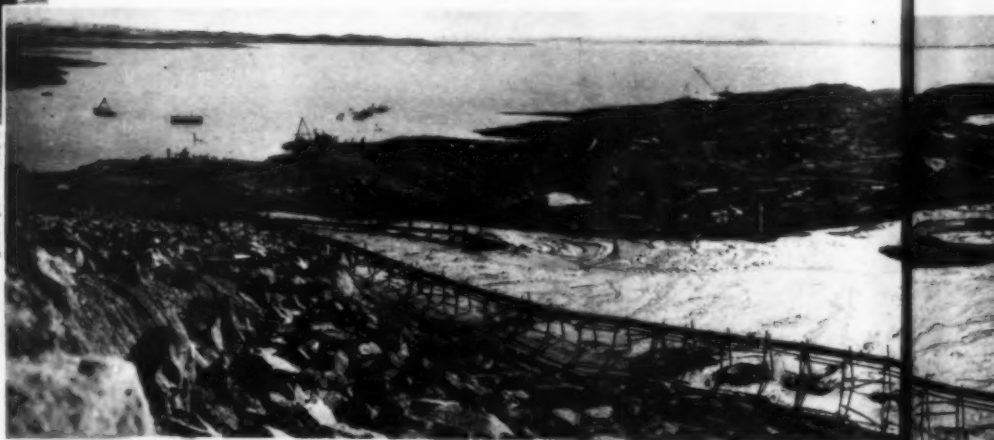


**SANDHOG HONORED IN SCULPTURE.** Robert Johns, selected as typical compressed air worker employed by Walsh Construction Co. on Queens-Midtown tunnel under East River, New York City, poses for 2-ft. model in clay by Leo Lentelli, New York sculptor. Finished statue will be exhibited by Port of New York Authority at New York World's Fair, 1939.

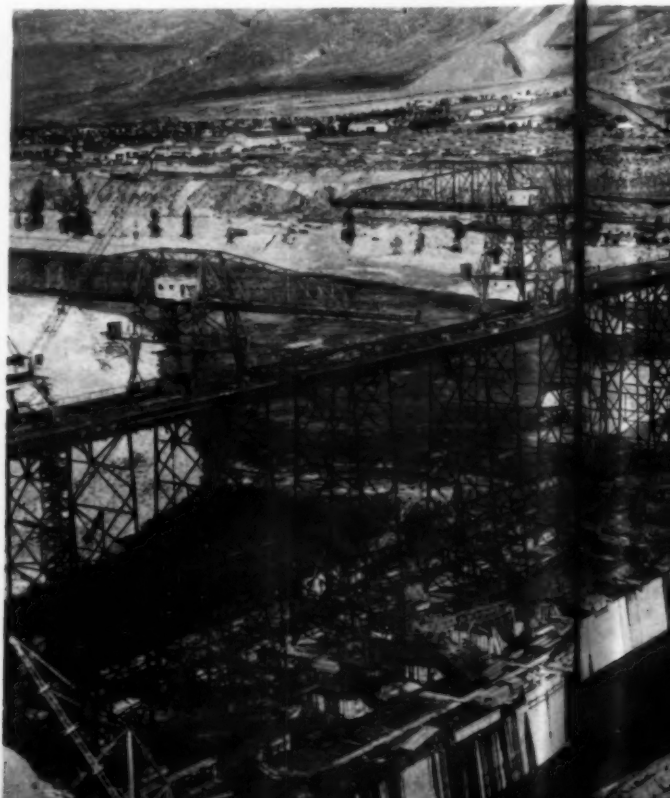
**ROAD SHOW (below)** and thirty-sixth annual convention of American Road Builders' Association will be held in San Francisco, Calif., March 7-10, 1939, concurrently with annual convention of Associated General Contractors of America. Theme of first joint conclave on Pacific Coast of road builders and general contractors will be "Highways of Tomorrow," symbolized in model (above) for display at San Francisco's Civic Auditorium where big exhibit of equipment and materials will be staged. Viewing model are (left to right, standing): Henry M. Schramm, president, Schramm, Inc.; W. P. McDonald, president, William P. McDonald Construction Co.; Charles M. Upham, engineer-director, A.R.B.A.; Murray D. Van Wagoner, A.R.B.A. president and state highway commissioner of Michigan; W. M. Parrish, president, A.R.B.A. Manufacturers' Division and sales executive, International Harvester Co.; Paul L. Griffiths, vice-president, Koppers Co.; George F. Schlesinger, engineer, National Paving Brick Association. Seated at table are (left to right): C. D. Macpherson, Gar Wood Industries, Inc.; C. W. Brown, state highway engineer of Missouri; and Lion Gardiner, vice-president, Jaeger Machine Co.



**FAIR BUILDINGS (right)** near completion for San Francisco's Golden Gate International Exposition to open early next year. Site is artificial island alongside San Francisco-Oakland Bay bridge, created by dredging from San Francisco Bay. In center of building group is Tower of the Sun, theme structure of exposition.



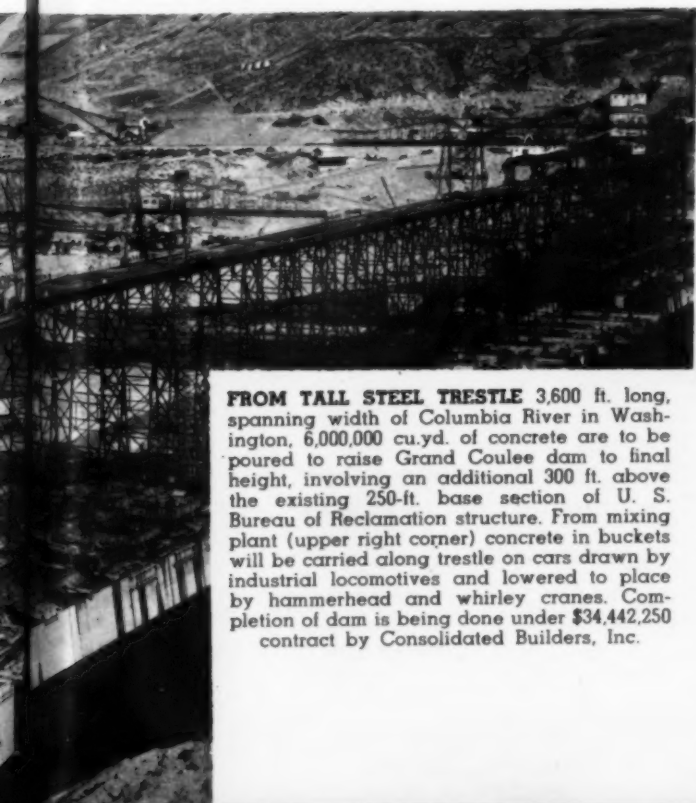
**SALVAGE AND RECONSTRUCTION WORK** is in progress by U. S. Engineer Department at Fort Peck dam, 100,000,000 cu.yd. hydraulic fill on Missouri River, in Montana, following slide on Sept. 22 which carried 8,000,000 cu.yd. of material from upstream face of structure into partially filled reservoir. The slide involved a section about 2,000 ft. long and 90 ft. deep. Salvage operations consist of recovery of equipment, construction materials, field boulders and quarry stone. View, above, looks toward reservoir.



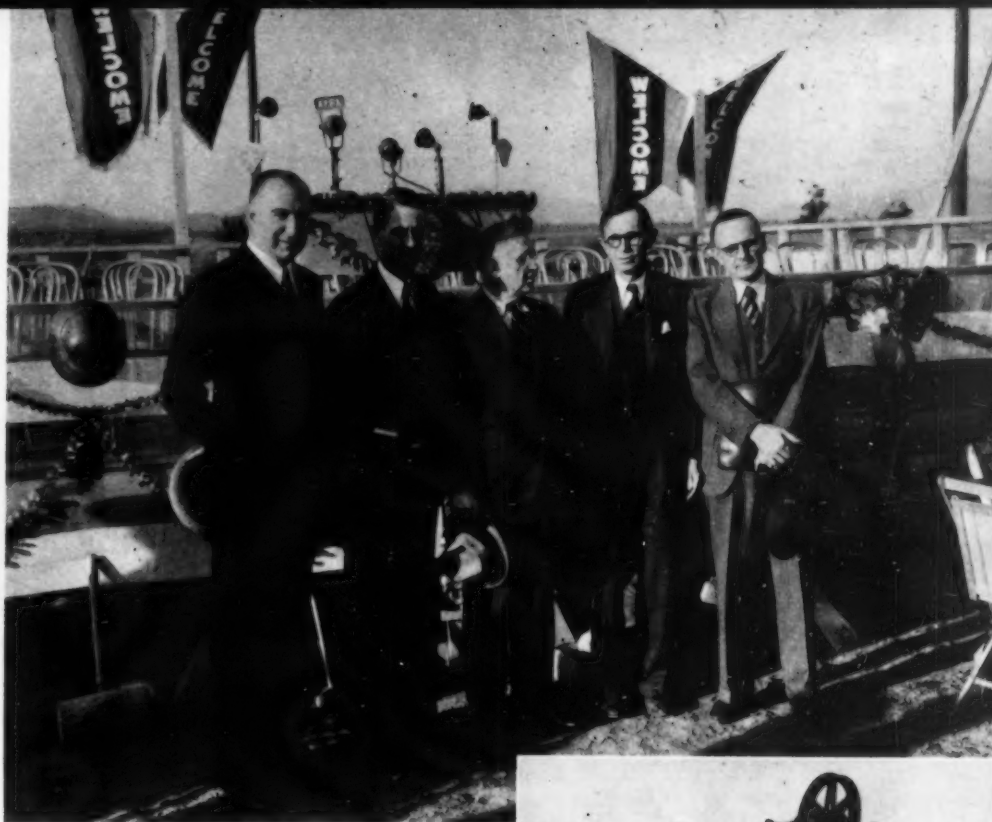




voir from east side of damaged area. In left background, field boulders are being recovered by shovel and dump trucks and hydraulic fill is discharging from dredge pipe line into protection levee outside of core limits. In center background, crane and flat-bed trucks are salvaging quarry stone. A second dredge pipe line is in position at far end of dike. Core pool boat, at right, is ready for operation after completion of soil investigations.



**FROM TALL STEEL TRETTLE** 3,600 ft. long, spanning width of Columbia River in Washington, 6,000,000 cu.yd. of concrete are to be poured to raise Grand Coulee dam to final height, involving an additional 300 ft. above the existing 250-ft. base section of U. S. Bureau of Reclamation structure. From mixing plant (upper right corner) concrete in buckets will be carried along trestle on cars drawn by industrial locomotives and lowered to place by hammerhead and whirley cranes. Completion of dam is being done under \$34,442,250 contract by Consolidated Builders, Inc.



**CEREMONIES** marking start of heavy construction on U. S. Bureau of Reclamation's \$35,939,450 Shasta dam, main feature of Central Valley project, took place Oct. 22 at Redding, Cal. Present while power shovel (right) of Pacific Constructors, Inc., removed first dipperful of earth from site were following federal and state officials (above, left to right): Earl Lee Kelly, director, California Department of Public Works; John C. Page, commissioner, U. S. Bureau of Reclamation; Harold L. Ickes, Secretary of the Interior; Edward Hyatt, California state engineer; and Walker R. Young, supervising engineer in charge of Central Valley project for U. S. Bureau of Reclamation.



**NEW ALTAMONT PASS REALIGNMENT** (below), modern four-lane divided highway involving heavy grading operations (2,000,000 cu.yd.) is opened to traffic by California Division of Highways. Note parking area in right background. Improved route, costing \$945,000, eliminates 8½ mi. of narrow, winding grades that formerly constituted traffic bottleneck on state highway No. 5 between Livermore and Tracy in Alameda County. New highway, with plant-mixed asphalt surface on crusher run base, is designed to carry from 2,500 to 3,000 vehicles per hour. Contractors for grading and paving were Granfield, Farrar & Carlin, of San Francisco, and for grade separation structures A. J. Raisch, of San Jose, Healey-Moore, Frederickson & Watson Construction Co., and Fredrickson Bros.



# Proper Selection, Use and Care of

## SMALL TOOLS

### Pay Dividends in Construction Work

BY GEORGE E. DEATHERAGE

*Construction Engineer*

*St. Albans, West Virginia*

**T**HE USE, selection and care of small tools on construction work is becoming constantly a more important item in these days of high labor costs and demands for increased speed. It is interesting to recall that Frank B. Gilbreth, who became one of America's greatest and most quoted experts on costs and production, and who contributed

greatly to scientific management in modern industry, began his career as a contractor. In 1904, as a preliminary to his later activities in the field of scientific management, Gilbreth published a small book entitled "Field System," which included several chapters on the use and care of tools.

The selection and purchase of small

tools on construction work should, of course, be based on economic results, safety and increased speed of production. This, however, is not always a hard and fast rule to follow. Every once in a while a tool is developed by manufacturers that

does a difficult job so well that it becomes indispensable. An instance of this is the small electrically driven power saws which, equipped with abrasive disks, will cut glazed brick to true lines neater and better than any method yet developed.

Another illustration of where a tool is not warranted from the standpoint of immediate job economics, but fully necessary from another viewpoint, would be that of safety. A strain gage may be used only once in the lifetime of a job, but its cost of several hundred dollars in measuring the load on a derrick guy cable would be repaid many times over in preventing a serious accident. Other considerations, although secondary in nature, are oftentimes important when selecting and purchasing tools. These are the possibility of using lower priced labor, more accuracy, standardization and interchangeability of parts, the reduction of repair costs, etc. All of these points are of importance and must be taken into consideration.

#### Who Supplies Tools

It has been the writer's observation over a period of many years that contractors are making it a practice to follow the procedure of the manufacturing industries in supplying the workmen with proper and safe



**SAVING CARPENTER'S TIME** on concrete form construction, electrically powered Skilsaw quickly rips plywood panel to size.



**STRESS GAGE** may save many times its cost by preventing accident on job. Martin-Decker tension indicator measures cable stress on dam project.



**TO CUT FORM RODS** and wire ties, Porter swivel-head bolt cutter operated by one man gives quick, powerful shearing action.





**ELECTRIC POWER** to operate small tools on bridge job is supplied by Homelite 2,500-watt 120-volt portable gasoline engine-generator weighing 135 lb. Unit is useful also for floodlighting at night.



**HEAVY RATCHET WRENCH** of Lowell manufacture turns nuts on  $3\frac{1}{2}$ -in. suspender bolts supporting steel centers under ribs of concrete arch bridge.



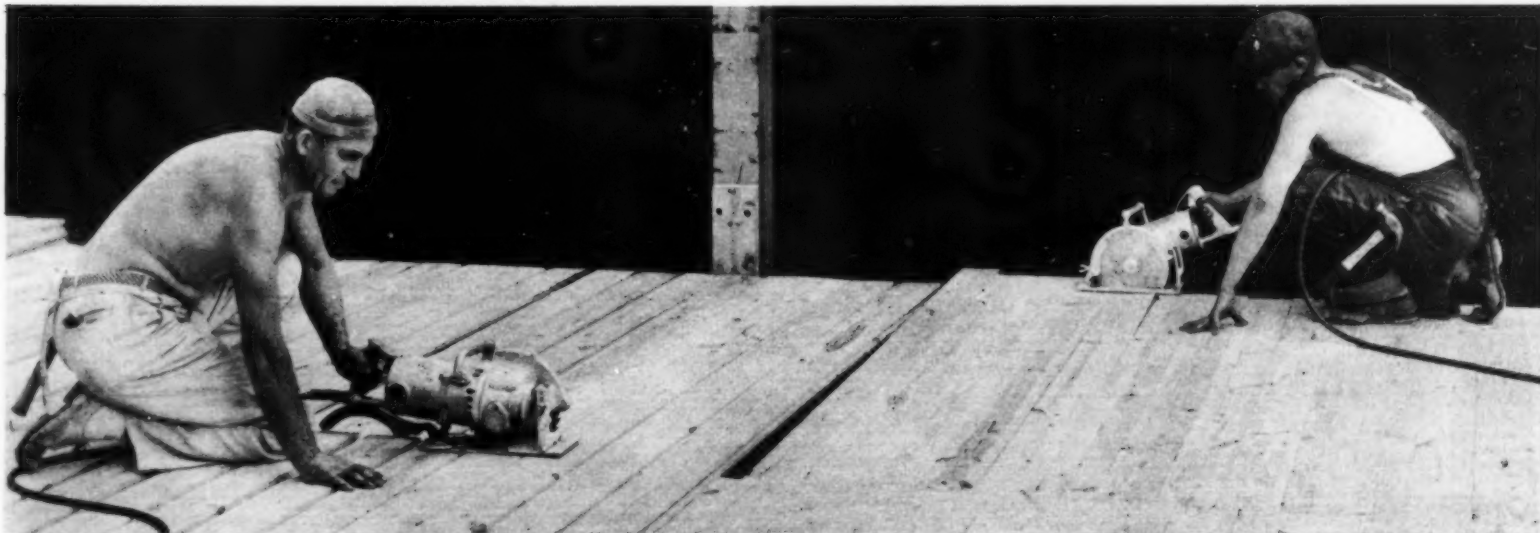
**PORTABLE GASOLINE ENGINE** and flexible shaft assembly weighing 60 lb. drives tools for concrete rubbing and finishing, drilling in various materials, grinding, sanding and polishing. Mall engine idles at 600 r.p.m. and has top speed of 3,000 r.p.m.

tools, as opposed to the traditional practice of depending on the workmen for them. This change has been brought about gradually for certain definite and logical reasons. The advent of mass production in large industrial centers, the increased specialization of individual tasks, coupled with increased labor turnover due to increased speed of completion, has made the change necessary both in the interest of economic production and in fairness to the workmen. Year by year construction methods are becoming more standardized, although the technique of construction never will approach the point reached in the manufacturing industries for the reason that building can never become a repetitive business. What are known as "standard jobs" rarely exist on construction, for it cannot be compared with the business of manufacturing typewriters or automobiles.

The selection of tools to be provided, therefore, both in type and



**STAINLESS STEEL SAW** made of Electromet ferro-alloy retains sharpness and smooth finish untouched by corrosion.



**ROOF SHEATHING** is cut to length in place by continuous operation of two electrically driven Skilsaws.



**SAW GUIDE** is to portable electric saw what miter box is to hand-saw. Mail guide supports saw above work and gives facility of radial mounting with additional advantage that lumber does not have to be moved.

number, is for each job, dependent on the nature and extent of that job. Careful planning in the beginning will save many delays as the work progresses. Although the construction industry, by the very nature of it, cannot hope to reach the efficiencies maintained in that of repetitive factory production, they can learn much from the factories in the selection, purchase and handling of small tools.

It is probably safe to say that the greater part of the demand for the modern, high speed, efficient tools on the market today has been from the manufacturing industries. Here, the volume was of such proportions

that the tool manufacturer found it possible to make the initial investment for their development. The construction industry has benefitted thereby. Construction management, interested in lowering costs, should make it a point to keep in touch with new tool developments through the various business and trade publications that constantly record progress along these lines. Small tool development and manufacture has reached a very high stage in America, and in the writer's opinion has progressed farther than the average builder's ability to make use of them in his work.



**ADJUSTABLE 12-IN. WRENCH** (one of seven sizes in this type of Williams' wrench) tightens wire rope clips on hoisting cable.



**DECK TIMBERS** on bridge job have bolt holes quickly drilled by Stanley portable electric drill.

#### Wear and Obsolescence

It is safe to say that the majority of small tools used on construction work are to a great extent either worn out or obsolete within 2 years from the purchase date. The development of new and improved tools or methods, normal wear and tear in use, therefore, seems to require taking a yearly depreciation of 50 per cent. Contractors seem to make a general practice of charging off small tool costs immediately, and to the job on which they are to be initially used. Although this may be justifiable accounting practice, the 2-year depreciation rule reflects more accurate job costs.

Tool costs, like job labor costs, are most useful and accurate when

obtained on the contractor's own work, where the conditions are known and given accurate value. Lacking this, the purchase of them is like all purchases, dependent on the application of common sense and good judgment to the problem at hand. While it is true that few contractors are organized to maintain tool cost records, that does not detract from their value in determining true job costs and in establishing facts to be used in future purchases.

Few men in charge of construction appreciate the many items that enter into tool and equipment costs and are quite apt to discount them. This, mainly because the individual purchase itself is likely to be small. A very informative pamphlet on equipment ownership expense can be ob-



**CUTTING** of Keasbey & Mattison asbestos-cement pipe is done simply and quickly by use of hacksaw. In emergency an ordinary carpenter's saw may be used, but it will be dulled quickly because of abrasive nature of material being cut.

#### APEX CONSTRUCTION COMPANY

#### • RECEIPT •

#### For Tools and Supplies Loaned to Employees—Day Shift

I have received the following property from The Apex Construction Company for which I will be responsible and which I will return promptly. In the event of the termination of my employment for any reason whatsoever, I will return this property, or its equivalent in money may be deducted from the final wages due me.

DATE	PROPERTY	VALUE	SIGNATURE	WITNESS



As may be readily surmised, the supplying, maintaining, storing, issuing and shipping of small tools for a job employing several thousand men becomes a complex affair. It is also expensive, as many have discovered. This comes about because, on a great many jobs, the handling of tools and equipment is every man's job in general, and no one's in particular. The seriousness of the matter on the large high speed job can be illustrated through a contract on which the writer was in charge several years ago. At one time, during the height of the work, more than 700 pipe fitters were employed on a three-shift basis. The matter of getting several hundred competent fitters together in a few weeks was a job in itself, and seeing that each one was properly outfitted did not make things easy.

kits; (3) Having workmen obtain tools from a central tool house. On construction, all three of the above methods are used, as compared with the selection of one or the other in the repetitive manufacturing industries. The ideal to be reached, of course, is that of providing the tools on the job and preventing the waste and loss of time involved in running back and forth to the tool house or crib.

Irrespective of which of the above methods is used, the following factors must be considered and provided for:

[illegible]

- (1) Purchase and selection of proper tools.
- (2) Organization and personnel required.
- (3) Supervision of tool cribs.
- (4) Tool storage and inventories.
- (5) Operating conditions of tools.
- (6) New tool replacements.
- (7) Scrapping old and unsafe tools.
- (8) Maintaining spare parts and parts lists.
- (9) Tool clearances and records of workmen's kits.
- (10) Marking or stamping tools.
- (11) Repairing tools.
- (12) Dispatching tools and equipment.

- On a recent job of the writer's the matter of small tools was of such importance that a very large and efficient departmental organization had to be developed to handle it. In this instance the volume of work made possible a very close approach to the efficiency methods used in the modern factory.

The accompanying chart indicates the manner of departmental organization, which was under the general supervision of a Production Department whose main function was that of planning. Tools were handled through a centralized tool house, with auxiliary cribs in strategic job locations. With the exception of heavy equipment and very specialized tools, was responsible. Weekly inspection each workman was provided with a standard kit of tools which was checked to insure that they were in proper condition to use.

Typical of such standard tool kits is the accompanying example for an electrician.

Special tools, such as electric drills,  
(Continued on page 60)

1 6-ft. folding rule.	1 pr. long-nose pliers.
1 pr. 8-in. side cutting pliers.	1 pr. 10-in. gas pliers.
1 brace.	1 reamer for 2½-in. pipe.
1 set hole saws, to 4 in.	1 1½-in. ball peen hammer.
1 claw hammer.	2 cold chisels, ½ and 1-in.
1 each, star drills, ¾, ½, ¼, 1-in.	1 plumb bob.
1 10-in. level.	1 combination square.
1 set socket wrenches.	1 14-in. hacksaw.
1 10-in. pipe wrench.	1 14-in. pipe wrench.
1 copper ball peen hammer.	1 pr. rubber gloves, 10,000-volt.
1 set taps.	1 tap wrench.
1 assortment twist drills.	1 each, 4, 8, 12-in. Crescent wrenches.
2 rat-tail files, large and small.	1 14-in. mill file.
1 center punch.	1 brick point.
1 Yankee screw driver.	1 small screw driver.
1 50 ft. cloth tape.	1 key hole saw.
1 gasoline torch.	1 set stock and dies, to 1½-in.
1 oil can.	1 0-600 volt test set.

## Received of The Apex Construction Co.

One employment badge No. .... Value .....

Also Ten Tool Checks No's. .... Value .....

which, upon request or termination of my employment, I agree to return to the above company. In the event that I lose the tool checks, or any part of them, I authorize the company to deduct the value stated above from wages due me.

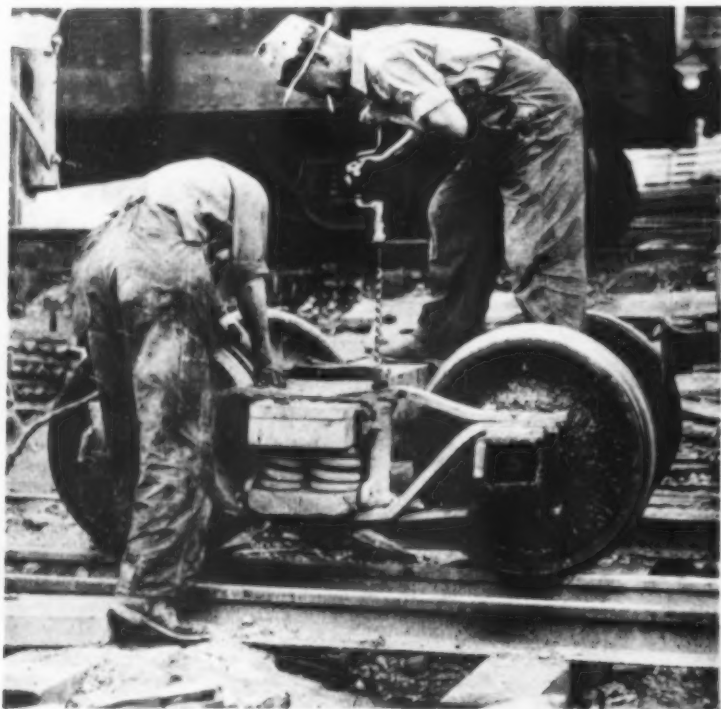
Dated ..... Signed .....

```

graph TD
    A[Tool and Equipment Section] --> B[Tool Room Attendants]
    A --> C[Tool-Equipment Records-Inventories]
    A --> D[Sub-Contractors Tools and Equipment]
    A --> E[Equipment Tool Repairs]
    A --> F[Equipment Dispatcher]
    F --> G[Motor Trucks]
    F --> H[Heavy Equipment]
    F --> I[Hired Motor Trucks]
  
```



**METAL BINS** for tools and parts are an economical investment on any project where permanent store-room facilities are warranted.



**BRACE AND BIT** drills bolt holes in timber bolster of dump car on contractor's 36-in. gage railway.

# HAND TOOLS AND SHOP EQUIPMENT

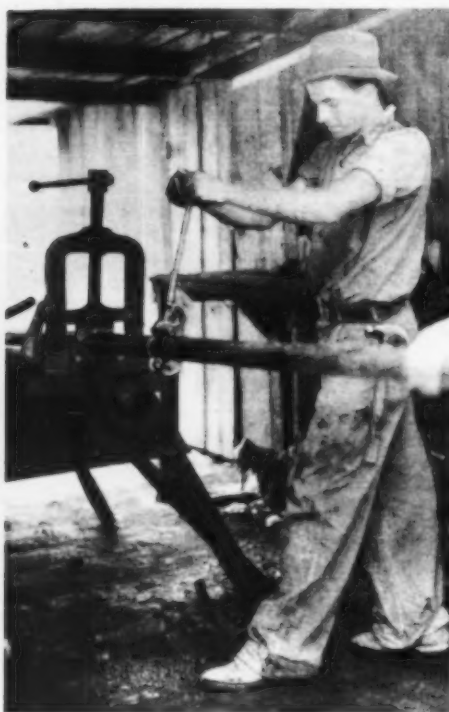
*Fill Important Place  
in Construction of  
Hydro-Electric Project*



**TWO-PRONG FORK** set in anvil at blacksmith shop bends hooks in rods to be used for form ties on dam blocks.



**SLUICE GATE** used to admit water to power house cofferdam in case of flood is operated by Chisholm-Moore chain hoist.



**FOR HAND CUTTING** of pipe, fitters use Trimo cutter on pipe locked in Erie bench vise.



**AFTER BEING CUT** to proper length, pipe is threaded with manually operated Toledo pipe threader.



**I**N CONSTRUCTING the Claytor hydro-electric development on the New River, 3 mi. upstream from Radford, Va., under the direction of the American Gas & Electric Service Corp. for the Appalachian Electric Power Co., the Rinehart & Dennis Co., Inc., Charlottesville, Va., contractor, employs the usual amount of small tools and shop equipment required by a project of this size, which involves placing 250,000 cu.yd. of concrete in the power house and in a dam 1,150 ft. long, with a maximum height of 98 ft. above river bottom. The Appalachian Electric Power Co. supplies crushed dolomite aggregates for concrete from an adjacent quarry and performs all electrical construction in the dam and power house, which will be equipped with four 18,750-kw. generators.

Accompanying photographs show some of the tools and shop equipment used by employees of the contractor and the power company in carrying on their respective operations. Except for the tools ordinarily carried in carpenters' kits, the contractor and power company supply

all small tools and equipment used on the job. Tools are issued from store rooms by clerks, and workmen are held responsible for return of the tools in good condition.

In addition to equipment illustrated for the blacksmith, bolt and pipe shop, the contractor operates a woodworking shop in which are installed an Egan rip saw, a Fay & Egan band saw and a cross-cut saw to handle the large volume of construction and form lumber used on the job. All shop equipment is driven by electric power.

For the American Gas & Electric Service Corp., H. S. Slocum is construction engineer in charge of the project. Operations of the Rinehart & Dennis Co. are directed at the site by H. D. Faulconer, general superintendent, and R. C. Perkins, superintendent.



**TO BEND SMALL PIPE**, mechanic fits Watson-Stillman hydraulic oil pipe bender of Appalachian Electric Power Co. with timber blocks. Steel blocks supplied with machine bend large sizes up to 6-in. diameter. Unit serves also to bend steel angles for job.



**HAND SAWS**, circular saws, and band saws hung on wall of sharpening shop make up only small part of stock required by carpenters on job and by power equipment in woodworking shop.



**FORM CONSTRUCTION** in power house requires brace and bit, spirit level and hatchet from carpenter's kit, as well as special tools supplied by contractor.



**TIEBOLTS** for concrete forms are threaded by Oster electric-motor-driven machine.

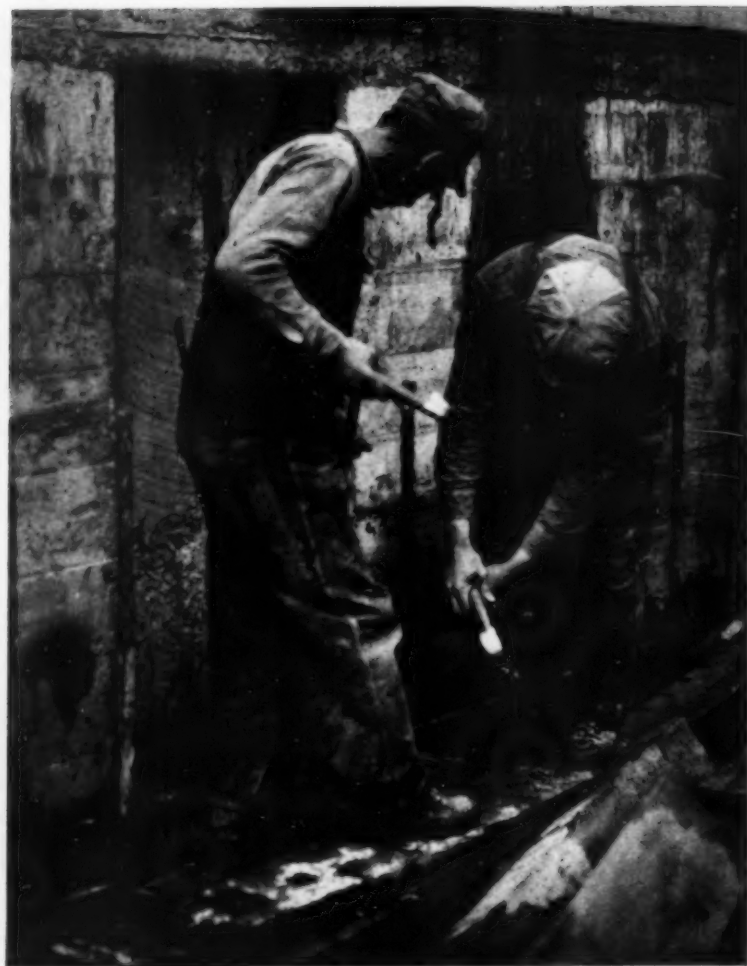


**PIPE WRENCHES** in great number are required by electrical crew of Appalachian Electric Power Co. installing conduits in dam and power house on project.

## Claytor Hydro-Electric Project



**TO DUMP** loaded side-dump rock cars into primary crusher at quarry crushing plant, owner installs hoisting tackle supported from steel A-frame and operated by Ingersoll-Rand electric hoist.



**WRECKING BARS** and hammers are indispensable for stripping form lumber on dam and in power house.



**SAW SHARPENER** employed by contractor devotes full time each day to setting and sharpening teeth on saws used by carpenters on project and by power equipment in woodworking shop.



**FOR QUICK PIPE THREADING**, contractor installs Oster electric-motor-driven machine in blacksmith shop.



# HAND-OPERATED POWER TOOLS

*Speed Small Jobs on \$6,000,000*

## *Dam Contract*

**H**AND-HELD and hand-controlled power tools perform thousands of small jobs economically and quickly for Brown & Root, Inc., and McKenzie Construction Co., Austin, Tex., builders of Marshall Ford dam on the Colorado River of Texas, 20 mi. upstream from Austin, under a \$5,781,000 contract supervised by the Bureau of Reclamation. Accompanying photographs illustrate labor-saving uses of air-powered and electric-motor-driven equipment supplied by the Chicago Pneumatic Tool Co.



**AIR-POWERED WOOD BORER** drills hole for tierrod in timber wale of concrete form.



**45-LB. VIBRATOR** with vibrating tube 3 in. in diameter and 25 in. long driven at 8,000 vibrations per minute by air motor at upper end of flexible shaft consolidates reinforced concrete around barrel in dam.



**CHIPPING HAMMER** cuts step in shoulder of concrete lift.



**UNIVERSAL ELECTRIC DRILL** mounted on home-made stand serves as drill press in storeroom and general maintenance shop.

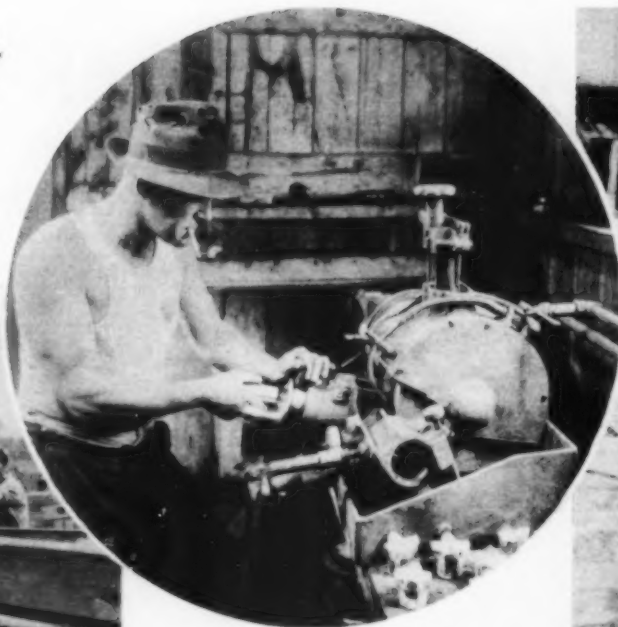


**JAM RIVETER** raised and lowered by rope tied to bucking-up pipe (screwed into holder-on connection at rear end of tool) facilitates overhead work in fabricating penstock.

**AIR-DRIVEN SUMP PUMP** (below), removes inflowing water from foundation excavation.



# DRILLING *and* BORING



**GRINDER** sharpens detachable drill bits with Ingersoll-Rand machine. Jackbits receive as many as eight grindings. This is a precision machine that grinds bits accurately to gage and sharpens cutting edge.



**WOOD BORING TOOL** of Ingersoll-Rand design puts  $1\frac{1}{8}$ -in. diameter holes through 12x12-in. timbers on bulkhead construction. It is operated by compressed air.



**WOOD AUGER** operated by compressed air is Ingersoll-Rand unit designed for boring bolt holes for concrete form construction.



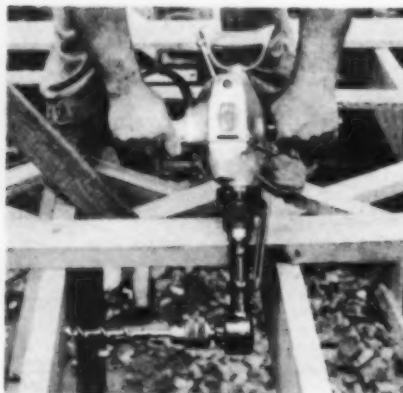
**ELECTRIC DRILL** bores holes in structural steel member out on the job. Thor unit is adapted to such operations as boring timber, reaming and counter-sinking, drilling all types of metal and hole sawing in light sheet metal.



**METAL WINDOW SASH** is drilled by Wodack electric tool which can serve dual purpose of drill or electric hammer. Change from hammer to drill is made by loosening cap screw and opening chuck. Drills  $\frac{3}{8}$ -in. holes in metal and  $1\frac{3}{8}$ -in. holes in masonry.



**ELECTRIC DRILL** of Skilsaw manufacture bores bolt holes for fabricating timber truss. Motor operates on direct or alternating current. Body of drill is of aluminum alloy, die cast for strength and minimum weight. Drill illustrated operates 1-in. ship auger.



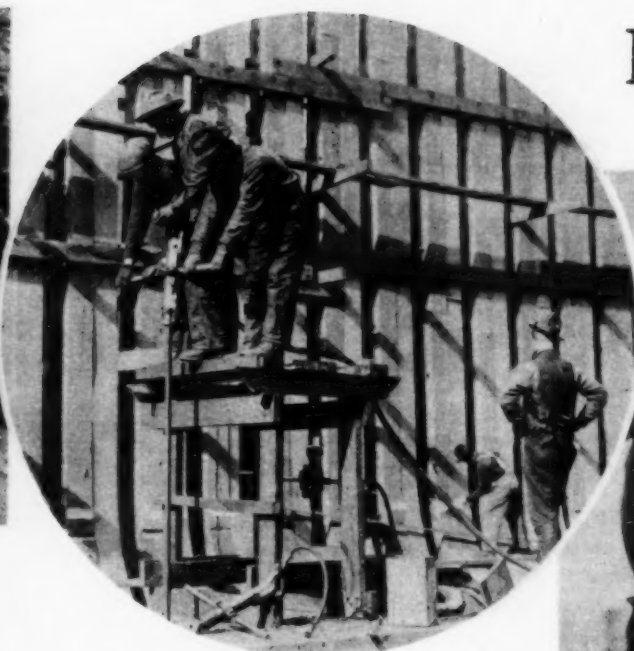
**RIGHT-ANGLE ATTACHMENT** (left) enables Black & Decker  $\frac{1}{2}$ -in. special electric drill, equipped with wood auger, to work in tight places. Drill weighs  $13\frac{1}{4}$  lb. and has overall length of  $17\frac{1}{4}$  in.

## SMALL TOOLS ON CONSTRUCTION





**SEWER PIPE IS CUT** with Thor chipping hammer operated by compressed air. In design of this tool dowel pins are eliminated by milling solid integral key on valve blocks which fits into key slot milled on barrel, thus holding block firmly in place.

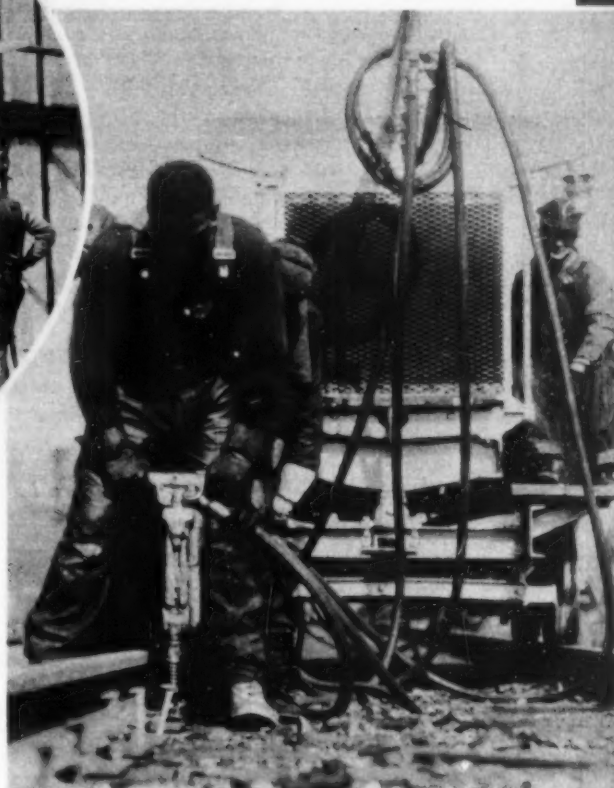


**DRIFT BOLTS (above)** on wooden ship construction are driven by Ingersoll-Rand pneumatic tool.

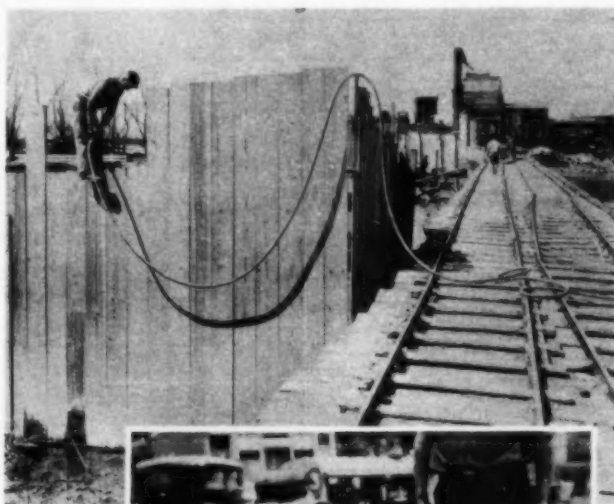
## HAMMERS



**SHEETPILING (below)** in connection with shafts, caissons, sewers, subways and other types of heavy construction, is put down by Thor pneumatic hammer. Tool handles either wood or steel sheeting.



**TIE TAMPING** and spike driving (above) by railway maintenance crew is speeded up by use of Ingersoll-Rand pneumatic tool.



**ALONGSIDE SUBWAY EXCAVATION (below)** wood sheetpiling is driven by Ingersoll-Rand pneumatic pile hammer equipped with guides that prevent it slipping off the head of the pile.

**DRILLING OF CONCRETE (above)** is done with Black & Decker portable electric hammer. This tool, weighing 17 lb., is capable of drilling a 1 1/8-in. hole in concrete or brick, striking 2,300 blows per minute; overall length 17 3/8 in.

**WEBBING TOOL** and hammer (below) broaches line of holes drilled in concrete wall with star drill. This Black & Decker tool, electrically operated, weighs 17 lb. and strikes 2,300 blows per minute.



**PAVEMENT BREAKING** in a midwestern city is facilitated by use of Sullivan pneumatic breaker equipped with chisel point.



## SMALL TOOLS ON CONSTRUCTION

**N**EW MATERIALS are constantly being developed which, when applied to hand tools, improve performance not only directly through such factors as increased strength and toughness, but also indirectly by permitting advantageous modifications in design. For example, a weight reduction in an open-end wrench, achieved through the use of an improved material with a higher strength-weight ratio, would result in a more slender tool with thinner jaws; the utility of the tool would thus be improved by reason of its ability to operate in narrow spaces difficult of access.

Most hand tools are made of steel, and steel is a material which can be vastly improved through the judicious use of relatively small quan-

surface hardness is advantageous provided such a wear and abrasion resistant surface can be obtained without too great a sacrifice in the toughness and resistance to impact of the part as a whole. In such cases the use of a case-hardened steel is usually indicated. Low carbon nickel alloy steels lend themselves admirably to the case-hardening process. They provide hard, wear resistant cases, tough enough to avoid chipping or spalling in service, adequately supported by strong and ductile cores.

The use of nickel alloy steels for hand tools is indicated wherever there is need for high strength and toughness combined with light weight, improved wear and fatigue resistance, high impact strength, or better ductility—these characteristics to be com-



**LIGHTWEIGHT  
WRENCHES** of open-end  
and box types are of  
nickel alloy steels.

# Nickel Alloy Steels for SMALL TOOLS

ties of alloy. One of the most effective agents in this respect is nickel. The effects of nickel on steel are such as to improve the physical properties without introducing undue fabrication difficulties to trouble the tool manufacturer.

The mechanical properties of steel can be altered by adjustment of carbon content and heat treatment. Unfortunately, however, the harder and stronger steel is made, the less tough and ductile it becomes, and the more inclined toward brittleness. Obviously, hardness and strength are desirable characteristics in most tool applications but a limitation is placed upon how far it is possible to go in this direction, due to the necessity for maintaining adequate toughness and ductility. One of the primary functions of nickel in steel is to extend this limit through improvement of the strength (or hardness) vs. toughness ratio. Nickel alloy steels may be used at higher strength and hardness levels without danger of inadequate toughness. There are in general use, in addition to the straight nickel alloy steels, many steels containing nickel in combination with one or more of the elements chromium, molybdenum, vanadium, copper, manganese and silicon.

In many tool applications great

combined with ready response to the usual fabricating operations and simple, more fool-proof heat treatment. They are recommended for such tools as wrenches, hammers, chisels, screwdrivers, wood-working tools, pliers, nippers, rivet sets, saws, knives, punches and lifting jacks.

The following paragraphs, in which specific applications of the nickel alloy steels will be discussed, are intended to indicate the way in which advantage may be taken of these steels to obtain improvement in many different directions:

## Wrenches

The class of tools covered by the generic term "wrench" comprises a great many subdivisions, such as box wrenches, open-end wrenches, adjustable wrenches, socket wrenches, pipe wrenches, Stillson wrenches, etc. In general they are all required to perform the same type of operation, namely, to apply a twisting moment to a threaded joint. Not infrequently, however a wrench may be required to pinch hit for a hammer, crowbar, jimmy or perform some other service for which it was never intended. Hence it is desirable to build into such a general utility tool a generous margin of strength and toughness.

By D. A. NEMSER and J. W. SANDS

*Development and Research Division,  
The International Nickel Co., New York*

This should not be accomplished at the expense of making the tool over-heavy or bulky, for the utility of such a tool is damaged through its inability to work in close quarters. Heavy wrenches are also unduly fatiguing to the operator.

For these reasons the medium carbon direct oil-hardening nickel alloy steels are well suited to wrench manufacture. By their use it is possible to produce strong, tough and durable tools, light in weight and designed for maximum flexibility. Organizations large enough to purchase custom-built wrenches frequently specify either 3½ per cent nickel steel or nickel-chromium steel, particularly when large tools are involved. For smaller size box and open-end wrenches nickel-molybdenum steel has proved a most admirable material. The selection of this steel was based on exhaustive tests of experimental wrenches of this and competitive steels. In these experiments the tools were used as hammers. They were squeezed in a vise in an effort to collapse the box

heads. In tests to simulate actual working conditions the nickel-molybdenum steel wrenches would twist the heads off the highest strength commercial heat-treated alloy steel bolts available, and to obtain a breakdown test it was necessary to substitute for the bolt a bar of heat-treated alloy steel the same size as the bolt-head.

Socket wrenches, both hand and power operated, provide a field in which the attributes of the nickel alloy steels are particularly useful. Accessibility is of prime importance and this factor limits the wall thickness of the sockets, resulting in high unit stresses in service. This type of wrench is usually operated at a relatively high speed, emphasizing the need for good resistance to impact and fatigue. Sockets are a screw machine product for which good machinability and uniformity are important. In view of the thin sections employed, the material used must not be "tender" toward heat treatment.

In practice both the medium car-

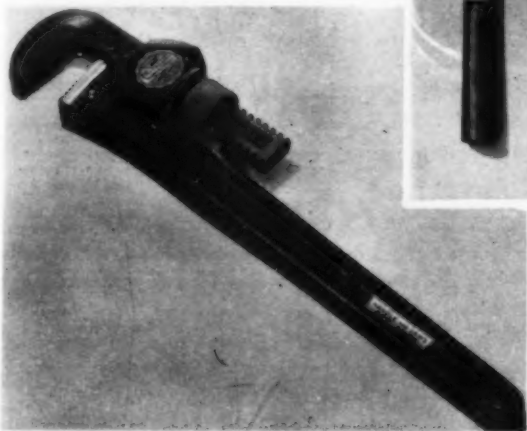


bon oil-hardening and the case hardening grades of nickel alloy steels are regularly employed for socket wrenches. Nickel alloy steels are also used for other components of power-operated socket wrenches, notably ratchet gears.

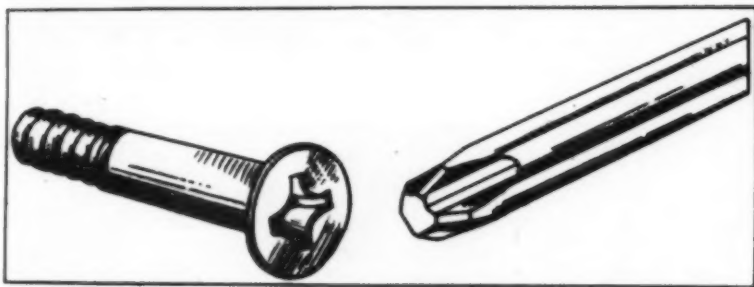
#### Hammers

As in the case of wrenches, there are many varieties of hammers, including the familiar carpenters' claw hammer, the machinists' ball, cross

(Continued on page 64)



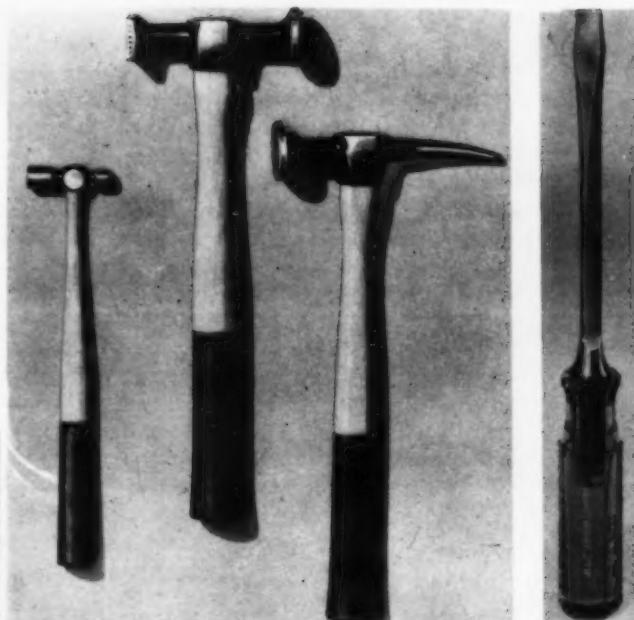
**HEAVY-DUTY PIPE WRENCH**, of which hook, heel jaws, and pins are of nickel alloy steel. (Ridge Tool Co.)



**RECESSED HEAD** type of screw (Phillips) designed for use with self-centering screwdriver. (American Screw Corp.)

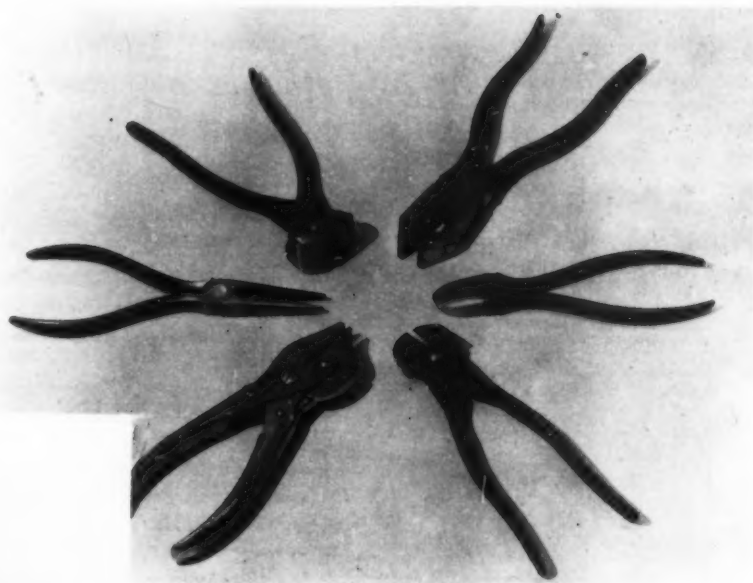


**RAILROAD JACK** in which parts highly stressed in service are made of nickel-chromium steel. (Templeton, Kenly & Co.)

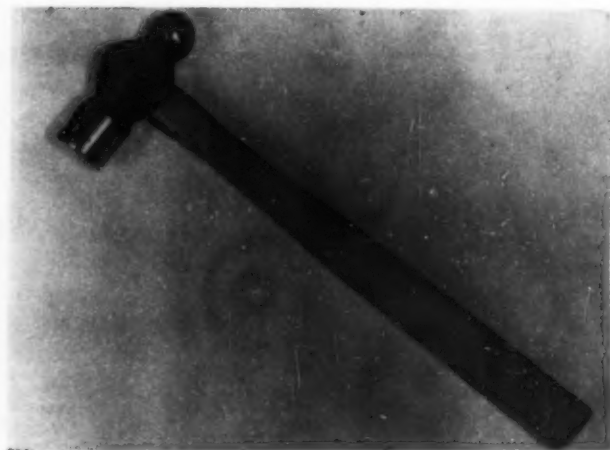


**HAMMERS** (left) of ball peen and dinging types are forged from nickel steel alloys. (Plumb Tool Co.) **SCREWDRIVERS** (right) of nickel alloy steel will stand up under rough treatment. (Stanley Works.)

**COLD FINISHED CHISEL** (below) of Z nickel; also scraper and spatula equipped with blades of same material.



**HEAVY-DUTY PLIERS** of different types forged from nickel-chromium steel. (Wm. Schollhorn Co.)



**MECHANIC'S HAMMER** of cast S Monel metal.

# How to Select and Use WRENCHES

Based on Recommendations of

J. H. Williams & Co., New York, N. Y.,

Manufacturers of Wrenches in More Than

50 Patterns and 1000 Sizes

**S**O MANY TYPES of wrenches are available in both carbon and alloy steel that the lines of leading manufacturers include as many as 50 patterns and more than 1,000 sizes. To the question, "Shall I choose carbon or alloy steel wrenches?" the answer is: "It depends on the job." Though alloy steel wrenches are the last word in strength and toughness, their cost is generally 50 per cent or more in excess of carbon steel wrenches of adequate strength for most purposes. Alloy steel wrenches for a given job are selected usually when either working clearances are limited and extreme slenderness is essential — often the case in automotive work — or when the higher cost seems justified to the user because of the higher finish in which such wrenches are offered.

The very simplicity of wrenches leads to the erroneous assumption that their correct handling is an automatic and natural function. Too many tool users overrate their knowledge, and the cost of their ignorance ranges from barked knuckles, or bad language, to the actual loss of life. A mechanic with a wrench works around a large gasoline storage receptacle. Not all the gasoline, of course, is in the tank; there is the ever-present, invisible gasoline vapor saturating the air nearby. The wrench strikes against a piece of steel or drops on to the concrete floor. With a terrific explosion and flash of flame the life of the mechanic is snuffed out, and great property damage results. This has actually happened, and more than once. No, it was not static electricity that caused the fatal spark; it was a steel impact spark, or flint-and-steel spark. The mechanic should have used a "non-sparking" safety wrench as merchandised for such hazardous conditions. He made the mistake of using a regular steel wrench because he didn't know!

Not uncommonly a mechanic is surprised, but secretly proud of his strength when a small wrench will break or permanently deform under

his powerful pull. His pull probably caused a unit strain in the wrench ten times greater than builders are allowed to impose on the steel beams, braces and other structural steel elements in modern buildings. Any wrench, or any machine, structure or creation of man can be broken, deformed or destroyed if an unreasonable strain is applied to it.

## Bolt Tightening

The strength of the bolt must be considered as well as the strength of the wrench. An inexperienced wrench user will often tighten nuts, bolts and cap screws to the point of stretching the bolt body, or almost stripping the threads. Unfortunately, this strained condition cannot be seen and serious damage might result from bolt breakage long after the tightening takes place. With average commercial wrench leverages the ordinary man can readily break bolts and strip threads up to 1/2- or 3/8-in. bolt diameters. Care therefore must be used and a sense of "feel" developed. Bolts which are 3/4 in. in diameter and larger cannot usually be set up too tight with average wrench leverages and there is little danger of damage to the bolt unless auxiliary leverage is added to the handle. Bolts



Fig. 2 . . . **SQUARE SEAT** on nut or bolt is essential for best wrench performance.

larger than 1 1/2-in. diameter are practically impossible of tightening to their full tension value, regardless of large extensions to the wrench leverage.

A screw thread is, after all, a remorseless spiral wedge which converts a light pull on a wrench into a tremendous force. This force, for any size of popular bolt up to 3/4-in. diameter, is about 60 times the actual pull applied to the end of an average wrench in tightening it, but is greatly decreased by rough nut seats and dry or rusty threads. Not many wrench users realize that the grip of a bolt and nut, when tightened by a wrench to hold parts together, is really that of an extremely powerful spring with an imperceptible stretch. The elasticity of the steel, or other metal in the bolt, causes this "spring" to maintain the grip indefinitely after the wrench is removed from the nut, provided other external forces do not apply an additional strain which, in itself, exceeds the tension stored in the bolt by the wrench effort.

## Special Applications

There are also certain wrench applications which, due to the nature of the article being tightened, require more than usual care in selection of the proper use of that wrench in operation. The servicing of automobile spark plugs is an excellent ex-

ample. Open-end and adjustable wrenches are rarely suited to this service. Box wrenches with abrupt handle offset, or deep sockets, (Fig. 1) are the best types to use. In using sockets, care should be exercised not to "rock" the socket sideways or the porcelain of the spark plug may easily be damaged. Seat the wrench squarely on the hex shoulder of the plug and draw up only tight enough to seat the plug base on the gasket. Any practice tending to distort the metal body of the plug should be avoided.

In the following paragraphs are given numerous other suggestions which are intended to contribute to the safety and efficiency of wrench users of all degrees of skill:

All wrenches will perform best and with highest strength when fully and squarely seated on the nut, or bolt head. (See Fig. 2.) If a solid, non-adjustable wrench is used, such as an open-end wrench, a box wrench or socket wrench, care must be taken to select the correct size opening for the nut or bolt to be accommodated. Test this by the amount of free back-and-forth movement of the wrench on a stationary nut. If you use the next larger wrench by mistake you may be deceived by a partial grip which will slip under a hard pull and injure you, the nut or the wrench. Do not attempt to pack shims between the nut and wrench jaw.

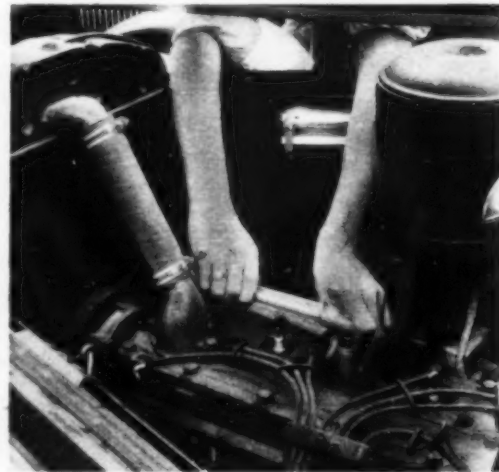


Fig. 1 . . . **SERVICING** of automobile spark plugs should be done with box wrenches (right) with abrupt handle offset or deep sockets.



Fig. 3 . . . **WORN OR SPREAD OPENINGS** on open-end wrenches are unsafe; such wrenches should be scrapped.



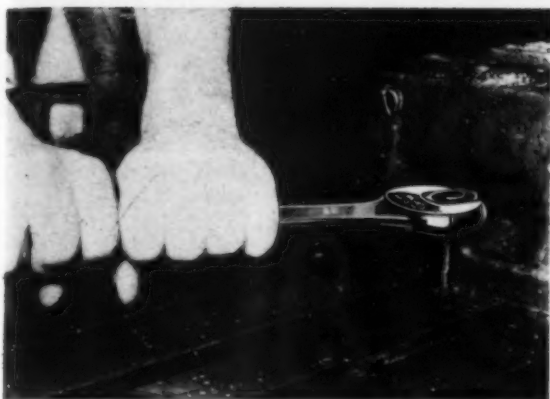


Fig. 4 . . . **PULL**, don't push, on open-end wrenches. Pull straight, avoid "cramping" wrench.

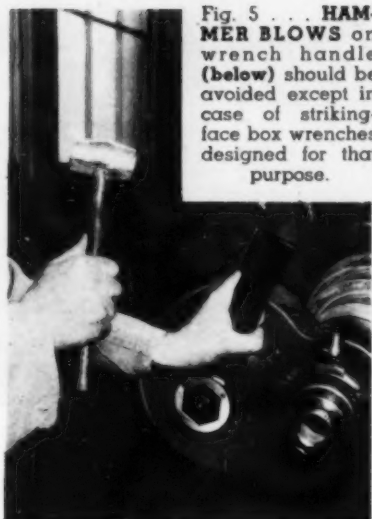


Fig. 5 . . . **HAMMER BLOWS** on wrench handle (below) should be avoided except in case of striking-face box wrenches designed for that purpose.



Fig. 8 . . . **ADJUSTABLE WRENCH** develops greatest strength when pressure of hand is applied to same side of wrench as carries fixed jaw



Figs. 6 & 7 . . . **"FLOPPING"** wrench upside down between swings gives angular advantage which permits continuously rotating nut or bolt in least possible space.

Don't expect open-end wrenches to be safe for hard pulls on worn and rounded hex nuts.

Don't use open-end wrenches, with badly worn, chewed and spread openings, particularly on hex nuts. (Fig. 3.) Such wrenches are unsafe and should be scrapped.

Wrenches in the United States are usually stamped with the nominal size of their opening; that is, the size of the nut, or bolt head across the hex, or square flats. For easy registry, wrench openings are usually 0.005 to 0.040 in. (proportioned to size) larger than the standard nut or bolt head size they are intended to fit. It is therefore easy to inspect worn openings for spreading.

#### Selecting Type of Wrench

The selection of the proper type of wrench for a given job is very important. Open-end wrenches are the best known type and are thoroughly dependable if both nut and wrench are reasonably correct in size or fit. Box and socket wrenches are safe and less liable to slippage; they permit poorer fits between wrench and nut, but tend to be a trifle clumsy or slow in operation when swing of the handle is limited. Ratchet wrenches and continuous rotation sockets offer maximum speed and efficiency

for feasible applications where swings are respectively limited and unlimited.

Think carefully before you push on a wrench. Nine chances out of ten, you will find it safer to pull. (Fig. 4.) Pull straight; avoid side strain or "cramping" of the wrench. Make sure your footing is good before you pull. Get the habit of figuring out what will happen if the wrench slips, the threads strip or the bolt breaks. Greasy hands, or greasy wrenches are dangerous. A dry, clean grip permits the hardest, safest pull. Never attempt to loosen, or tighten a nut on moving machinery.

If the bolt is larger than  $\frac{3}{8}$ -in. and you must use an auxiliary leverage, such as a pipe extension telescoping the handle, be sure they are strongly and well coupled. The practice of interlocking the jaws of two open-end wrenches to increase their leverage is neither safe, nor good practice. The best procedure for regular use where extra leverage is essential, is to purchase wrenches with specially long handles.

The application of hammer blows to a wrench handle, as a substitute for increased hand pull and increased leverage, is bad practice and sufficient cause for voiding warranties, except in the case of striking-face box wrenches (Fig. 5) which are de-

signed in the larger sizes for that purpose. If you must take the risk of spoiling wrench, or nut, or both by this practice, remember that a vast amount of energy can be stored in several sharp hammer blows and that if the wrenches were made for that kind of abuse they would be built only about one-half as long as regular wrenches.

#### Operations in Close Quarters

When the usual open-end wrench is operated in close quarters on hard-to-get-at nuts, it should be remembered that "flopping" the wrench upside down between swings (Figs. 6 and 7) gives an angular advantage which permits continuously rotating the nut, or bolt in the least possible space. It was Williams who first discovered (in 1887) that by this "flopping" trick, the usual 15-deg. angle wrench will operate a hexagon continuously where the swing is limited to 30 deg.; otherwise a 60-deg. swing would be necessary. Twelve point, or double hexagon box wrenches, which can be flopped, will operate with only half of these swings. Ratchet wrenches usually have teeth on the ratchet wheel so spaced that an operating swing of 15 deg., varying up to  $22\frac{1}{2}$  deg., will continuously rotate the nut or bolt.

Nuts and bolts which were made long ago were apt to be badly over or under their proper hex, or square size, and often would measure differently across one set of flats from across another. Naturally, many millions must still be serviced; they may cause wrench trouble unless handled carefully, especially when open-end wrenches are used.

Nuts and bolt heads are generally either of the cold finished or hot pressed variety. The hot pressed (rough finish) type are less expensive and, consequently, slightly less accurate in their outside dimensions. The selection and use of wrenches for such nuts (particularly of the hexagon variety) must be guided by caution because of increased hazard of poor wrench fits. In most cases where nuts and bolts are used in applications which require frequent servicing, it is found an over-all economy and safety measure to equip with cold finished nuts and bolts.

Open-end wrenches should not be hastily condemned because they show slight wearing or chewing of the jaws, and are not file hard. Careless selection of wrench size, or poor seating on the nut, or other abuses may spoil the best wrench made. Furthermore, wrench steels have been developed in recent years which are not file hard, but have a combination of hardness and toughness which makes them far superior to the case-hardened, file-proof wrenches formerly manufactured.

Any heating, or re-hardening of wrenches should be avoided. Many different grades of fine steel are used in wrenches and only very definite and accurate heat-treatment, adapted to the particular steel used, will insure their safe and satisfactory performance.

Adjustable wrenches and monkey wrenches will tend to round the corners of hexagon objects unless they are adjusted very carefully to a snug fit.

(Continued on page 66)



**SAFETY BELT** protects worker at Grand Coulee dam and leaves his hands free for wiring up steel reinforcement. His small tool equipment includes pliers and hammer.

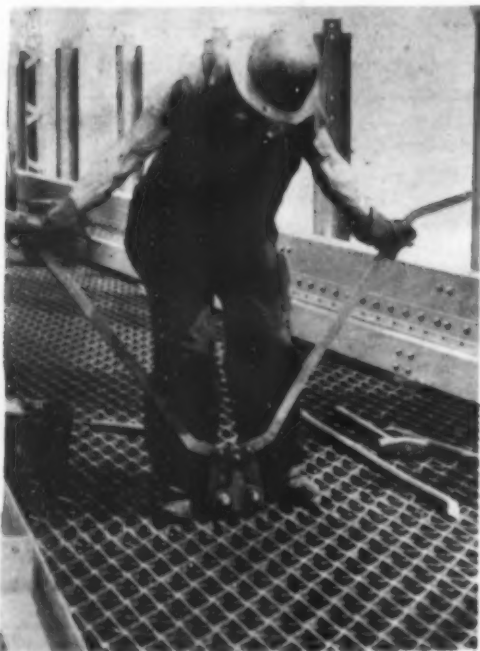
# How They Did It

APPLICATIONS OF SMALL TOOLS

*For Superintendents and Foremen*

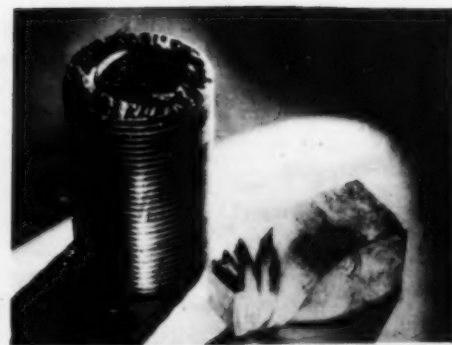
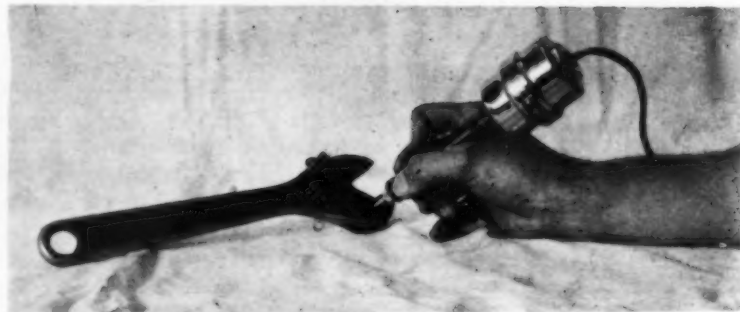


**CALKING COMPOUND** (left) is introduced into masonry joint by Horn calking gun. This operation is under way on the contract of James Mitchell for a portion of the New Jersey approach to the Lincoln Tunnel, New York City.—  
Photo from R. A. Wurgel.



**RIVET SQUEEZER** flattens head of rivet in slotted expansion connection on steel grating floor of lift span of Marine Parkway bridge, New York City.

**ELECTRIC MARKER** (right) with special diamond point, operating at 7,200 cutting strokes per minute, identifies wrenches and other small tools by engraving on them name of owner, thus preventing loss and theft. This marker is manufactured by Ideal Commutator Dresser Co.



**FOR REMOVING BROKEN SCREWS,** studs and broken pipe (above and left) the Reps extractor is a handy tool for maintenance men. It is a combination 4-point grip and reamer made of a solid piece of hard forged steel and turned by a wrench.





**VIBRATING** of forms and tamping of concrete for street lighting standards is done by Syntron electric hammer. This operation assures complete filling of forms with a dense, compact concrete.



**EMERGENCY WORK** is aided by flood lights served by portable generator and portable pump, both products of the Homelite Corp. Pump is a 3-in. self-priming unit and generator is a 1,250-watt machine.



**"WORK SHOP ON THE JOB"** is the name applied to the all-steel trailer-type Littleford tool box. Made in two models: One has partitions and divisions in both upper sliding shelf and main bottom section; the other has entire main bottom section undivided and sliding shelf complete with partitions. Partitions are bolted and can be adjusted or removed.



**ALUMINUM ALLOY** (left) is the material used for this Wood lightweight shovel. Use of aluminum makes tool rust proof and cuts weight in half.



**PORTABLE GENERATOR** driven by gasoline engine, supplies current to electric Skilsaw used by J. W. Ryan, contractor, in building a new station for Long Island Railroad at the site of New York World's Fair, on Flushing Meadow, New York.



ON HIS GRAND RIVER DAM JOB \*

# BLASTS ROCK

WITH A-C TRACTORS AND GAR WOOD AND CONT

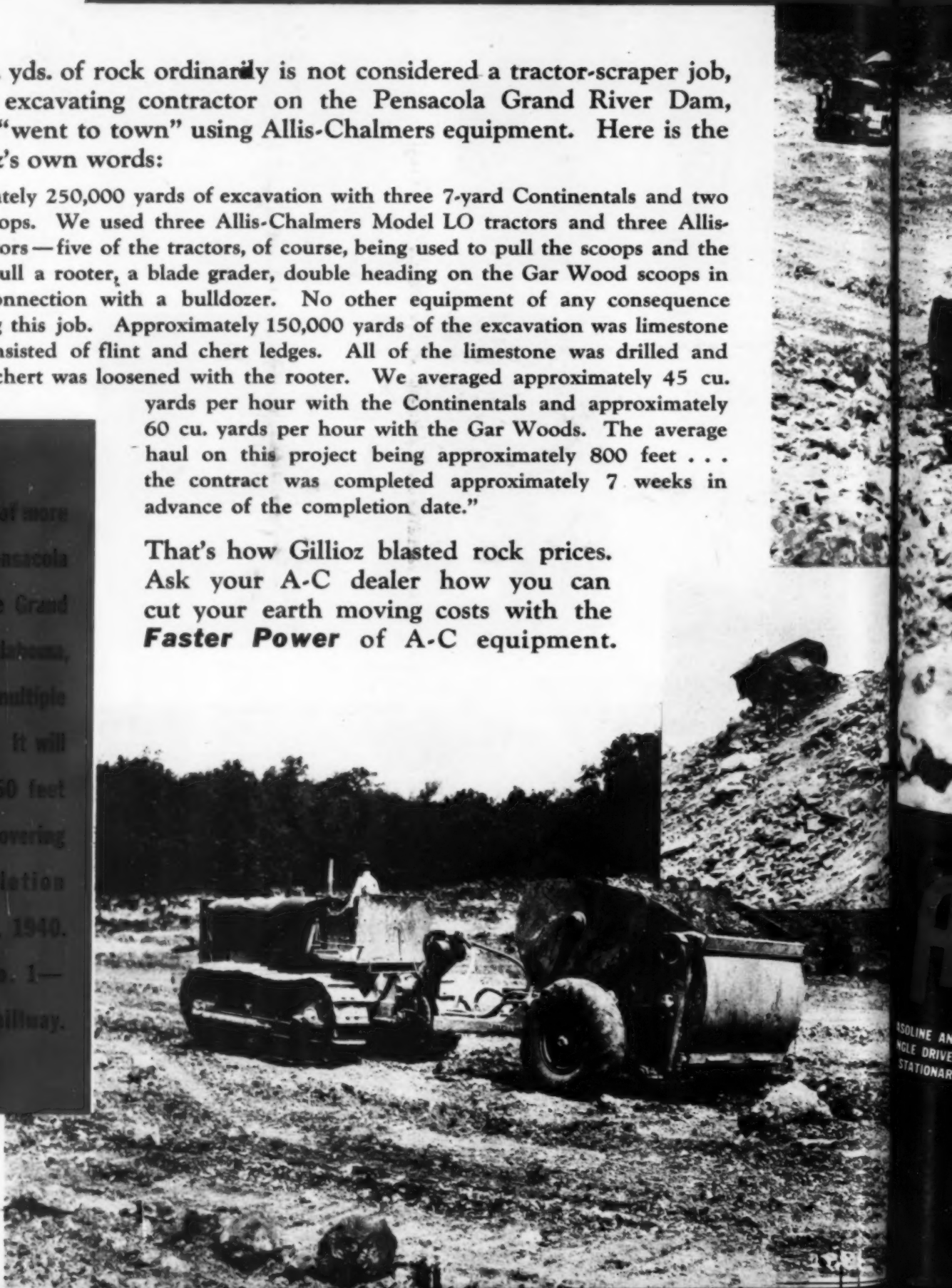
Moving 250,000 cu. yds. of rock ordinarily is not considered a tractor-scraper job, but M. E. Gillioz, excavating contractor on the Pensacola Grand River Dam, thought otherwise, "went to town" using Allis-Chalmers equipment. Here is the story in Mr. Gillioz's own words:

"We moved approximately 250,000 yards of excavation with three 7-yard Continentals and two 10-yard Gar Wood scoops. We used three Allis-Chalmers Model LO tractors and three Allis-Chalmers Model L tractors—five of the tractors, of course, being used to pull the scoops and the other tractor used to pull a roter, a blade grader, double heading on the Gar Wood scoops in tough going and in connection with a bulldozer. No other equipment of any consequence was used in completing this job. Approximately 150,000 yards of the excavation was limestone and the remainder consisted of flint and chert ledges. All of the limestone was drilled and shot and the flint and chert was loosened with the roter. We averaged approximately 45 cu. yards per hour with the Continentals and approximately 60 cu. yards per hour with the Gar Woods. The average haul on this project being approximately 800 feet . . . the contract was completed approximately 7 weeks in advance of the completion date."



Calling for an expenditure of more than \$20,000,000, the Pensacola Grand River Dam, on the Grand River in Northeastern Oklahoma, will be the world's largest multiple arch type concrete dam. It will be 6100 feet long and 150 feet high . . . will form a lake covering 54,000 acres. Completion date is set for January 1, 1940. Gillioz has Contract No. 1—Excavation for East Spillway.

That's how Gillioz blasted rock prices. Ask your A-C dealer how you can cut your earth moving costs with the **Faster Power** of A-C equipment.



GASOLINE AND  
ANGLE DRIVE  
STATIONARY



B. M. E. GILLIOZ

PRICES

ND CONTINENTAL SCRAPERS



M. E. Gillioz (Circle, upper left), Monett, Mo., long-time A-C fleet user and successful contractor on such big jobs as: the Fort Smith, Arkansas water supply dam, half-million yard highway project near Cedar Point, Kansas, and million yard Skyline Highway excavation in Virginia's Blue Ridge Mountains—all handled with A-C equipment.

**Uses a Minimum of Equipment**—Claude D. Workman, Gillioz' Superintendent in charge of construction, likes the Gar Wood-Continental combination. In addition to moving the rock in a hurry ... these outfits did much of the work of a bulldozer. Gar Woods maintained hauling roads and dressed up the fill ... Continentals spotted material exactly where wanted—backfill or straight dump. Both did general cleaning-up work. (Above) L-O and Gar Wood picking up a heaping load. (Lower Left) L-O and Continental on the way to the fill. (Inset) Continental dumping rock over the fill bank—no bulldozer required.

ALLIS-CHALMERS  
TRACTOR DIVISION—MILWAUKEE, U.S.A.

ASOLINE AND CONTROLLED IGNITION OIL TRACK-TYPE TRACTORS FROM 32 TO 80 DRAWBAR H.P. ... TANDEM AND SINGLE DRIVE SPEED PATROLS ... DRAWN BLADE GRADERS ... SPEED MAINTAINERS ... INDUSTRIAL WHEEL TRACTORS ... STATIONARY POWER UNITS FROM 31 TO 102 BRAKE H.P. ... TWO, FOUR AND SIX-WHEEL SCRAPERS, BULLDOZERS, TRAILBUILDERS, LOADERS, WINCHES AND OTHER ALLIED EQUIPMENT.

# WRENCHES



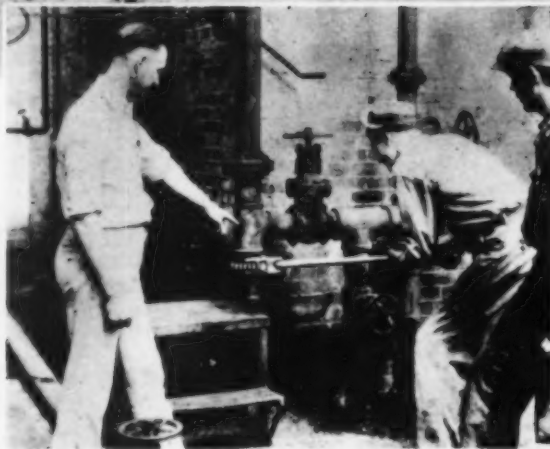
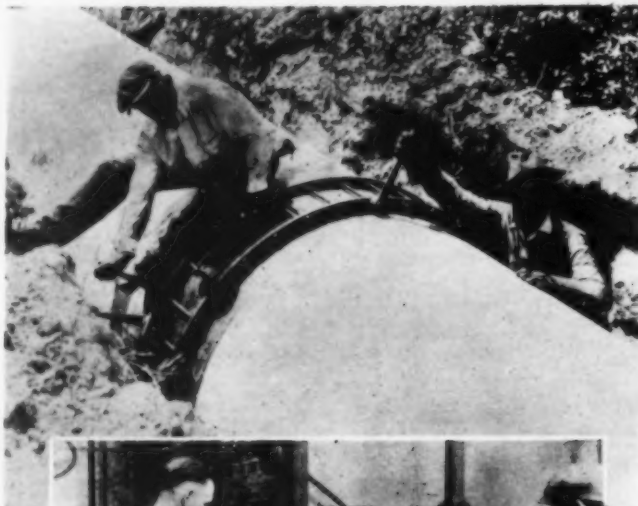
**STEEL WORKER** on water tank construction job uses Williams large size Hex-Box wrench. These wrenches are manufactured in range of sizes up to 3-in. U. S. Standard Nuts.

**TIGHTENING NUTS (below)** on pier construction was done by Ingersoll-Rand air drill equipped with special chuck. This pneumatic tool tightened 30,400  $\frac{3}{4}$ -in. nuts. Tool is served by hose from portable air compressor.



**ON SPRINKLER SYSTEM** in industrial plant worker uses Trimo-Alloy wrench on 2-in. pipe. Where user must work off balance and put weight on wrench, strength and safety of tool are essential.

**RATCHET WRENCHES (below)** are only tools needed for tightening nuts of Dresser coupling between sections of pipe on 60-in. water supply pipe line.



**PIPE AND FITTINGS** in oil refinery are handled by Williams tongs, made in seven sizes for pipes and fittings from  $\frac{1}{8}$  to 12 in. V-shaped recess in jaws assures quick and positive grip.



**LARGE SIZE ADJUSTABLE WRENCH** is employed on tank construction atop building. This tool is a 15-in. Crestoloy wrench with a capacity opening of  $1\frac{11}{16}$  in., made of alloy steel and weighing only  $1\frac{1}{2}$  lb.



**NUT TIGHTENING** or loosening is accomplished readily with Thor Hammer wrench, pneumatic tool designed for work in bridge and structural steel shops, locomotive works, shipyards, refineries, and automobile plants. Wrench operates at 1,800 impacts per minute. Weight 25 lb. Handles nuts up to  $1\frac{1}{8}$ -in. bolt size.

**PIPE TONGS (below)** offer simple means of turning oil pipe line for field welding.



## SMALL TOOLS ON CONSTRUCTION





**CONDUIT BENDER** operated by hydraulic power is used by Poirier & McLane Corp. on their contract for New Jersey approach to Lincoln tunnel, New York City. Portable Greenlee tool handles pipe from 1½ to 4 in. in diameter and makes difficult short bends.

**PIPE THREADS (right)** are cut by this Toledo pipe threader and cutter designed to operate on diameters from 2½ to 4 in. Portable stand holds pipe in convenient position to be worked on.

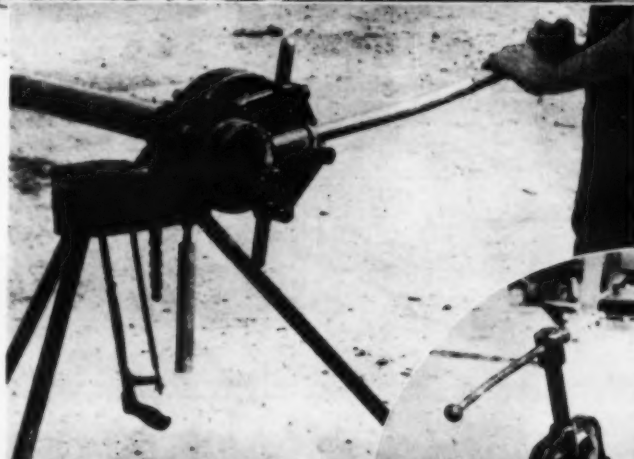
**WISE STAND (right)** holds pipe for threading and cutting. This unit is known as the "Handy-Andy" and is manufactured by Western Wire Products Co. Stand may be folded up when moving to a new location.

**POWER DRIVE (below)** is furnished on this pipe threading and cutting machine manufactured by American Die & Tool Co. Machine is shown during installation of plumbing and heating systems in building on estate near Philadelphia.

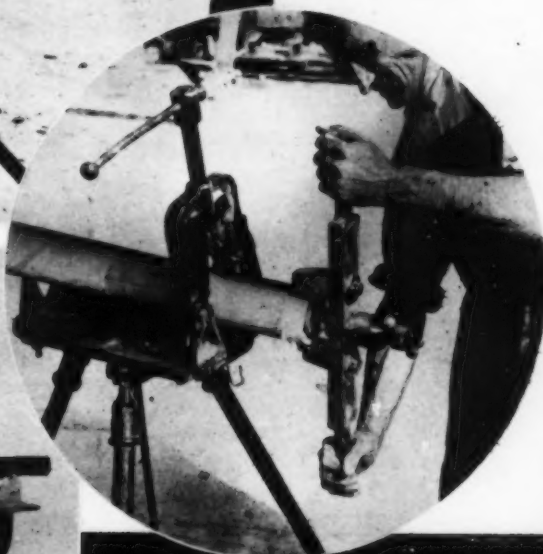


## PIPE TOOLS *and* VISES

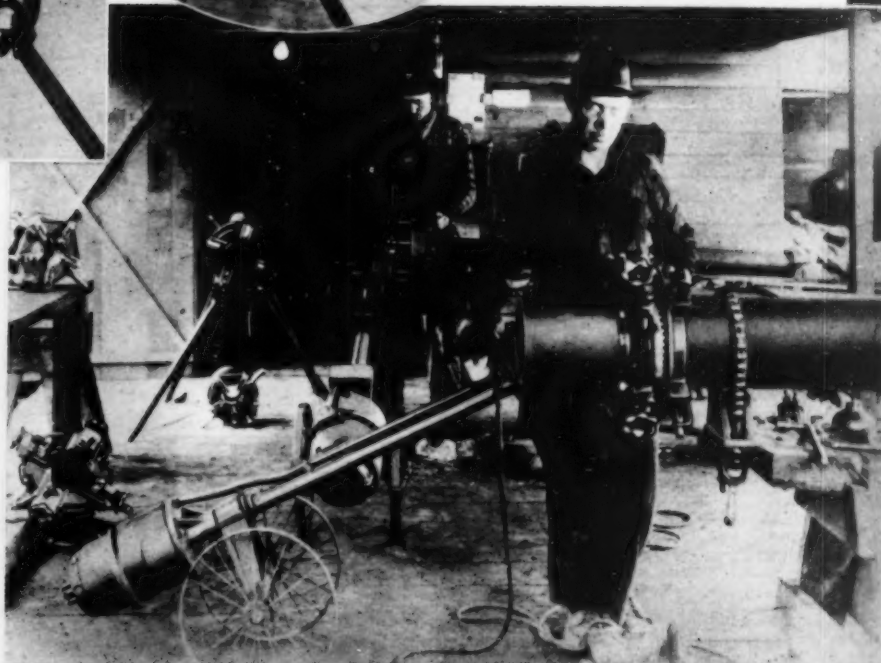
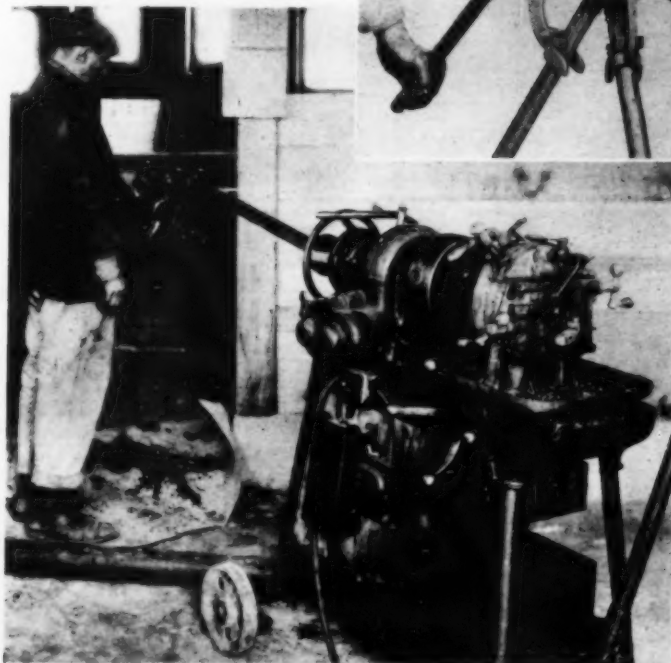
**PIPE VISE** proves useful on refinery construction job in mid-continent oil fields. This Vulcan vise, made by J. H. Williams Co., is entirely of wrought iron with drop forged jaws tempered for file sharpening. Made in four sizes to accommodate pipe ¼ to 8 in. in diameter.



**TAPERING TOOL (left)** prepares Transite asbestos conduit for jointing. Pipe stand and vise hold conduit in position for tapering operation.

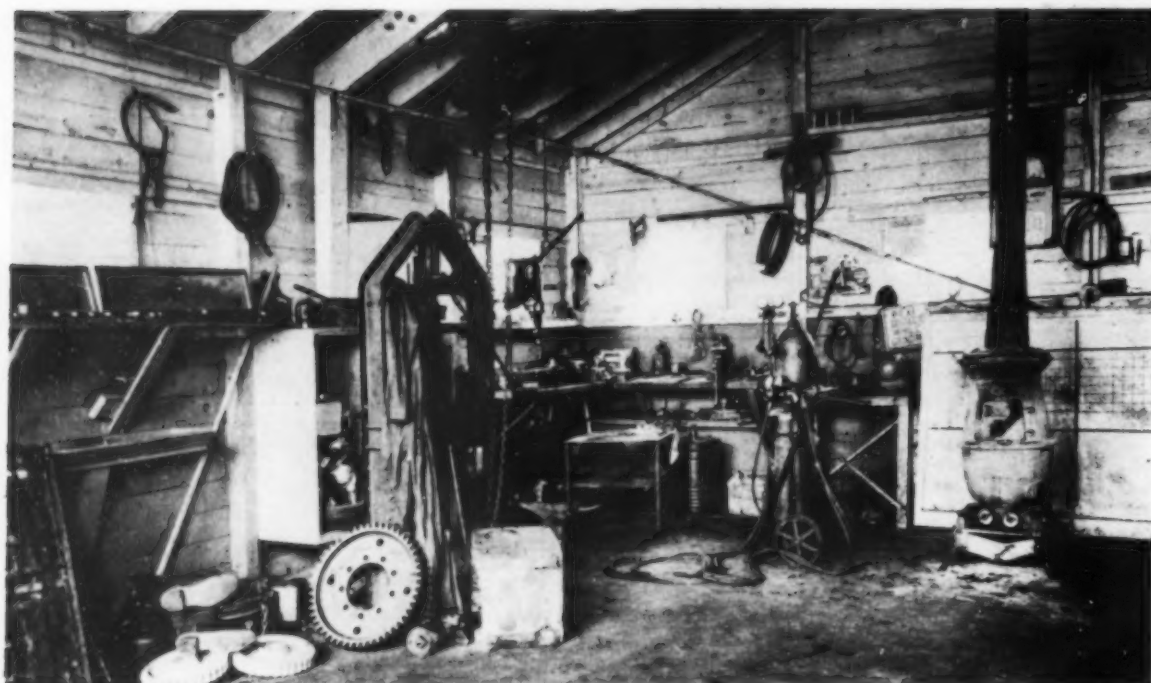


**GEARED CUTTERS AND THREADERS (below)** are operated by Toledo power drive unit handling pipe for large oil company. Consumes only fraction of time this work would require if done by hand labor.



# SMALL TOOLS ON CONSTRUCTION

# Small Power Tools Keep Highway Equipment in Repair at Local Maintenance Garage



**MAINTENANCE GARAGE** at Chatham, Va., serves one residency, under direction of resident engineer, in Lynchburg district of Virginia State Highway Department. State highway organization embraces 57 such residencies, divided among eight districts. Small residency garages take care of all light repairs and parts replacements for state highway equipment.

**V**IRGINIA'S HIGHWAY organization includes 57 maintenance and construction units, known as residencies, distributed among eight districts. Each of the residencies has an equipment yard, store room, garage and maintenance shop equipped with parts and tools appropriate for the light repairs and replacements supplied locally. The residency shops are supplemented by large maintenance garages at district headquarters. For major rebuilding and repair work, equipment is sent to the central maintenance shops in Richmond.

Pittsylvania County, one of the largest of 100 counties in the state, constitutes a single residency. At Chatham, the county seat, centrally located in the county, are the office of the resident engineer and the maintenance garage and store house where the accompanying photographs were taken.



**PREPARATORY TO ATTACHING** red reflector to highway truck, J. R. MARION, resident mechanic, sinks  $\frac{1}{4}$ -in. hole in rear stiffening plate of steel body with Van Dorn electric drill. Shop is equipped also with Sioux  $\frac{1}{4}$ -in. electric drill and Black & Decker  $\frac{3}{4}$ -in. drill.

**TO CHECK TOE** of front wheels on highway truck (right), garage mechanics use Bear wheel aligner.



**STOREROOM** in separate building of maintenance yard stocks materials and parts for local residency needs. Resident mechanic holds stock in storeroom to minimum and orders additional supplies as needed from district shop.





**BIN CARDS** in envelopes under bins keep running inventory of supplies and parts in stock.



**MOUNTED ON BENCH STAND**, electric universal 7/8-in. drill of United States Electric Tool Co. functions as drill press. Drill can be detached for use as portable tool.



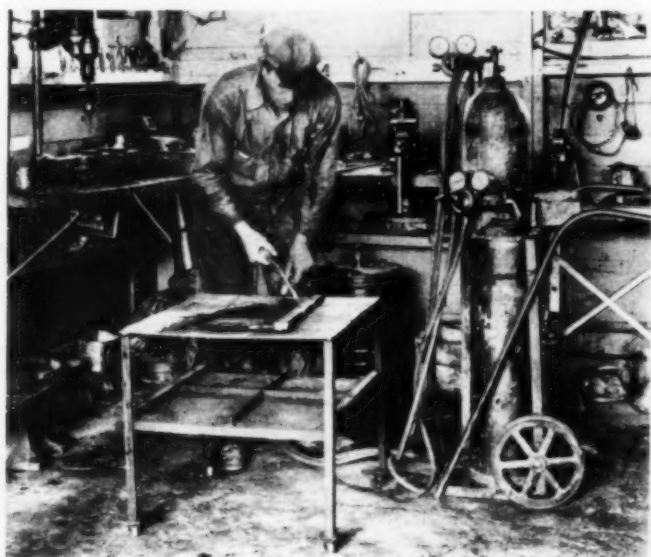
**EMERY WHEEL** on Sioux electric-motor-driven ball-bearing grinder grinds metal parts and tools in residency shop.



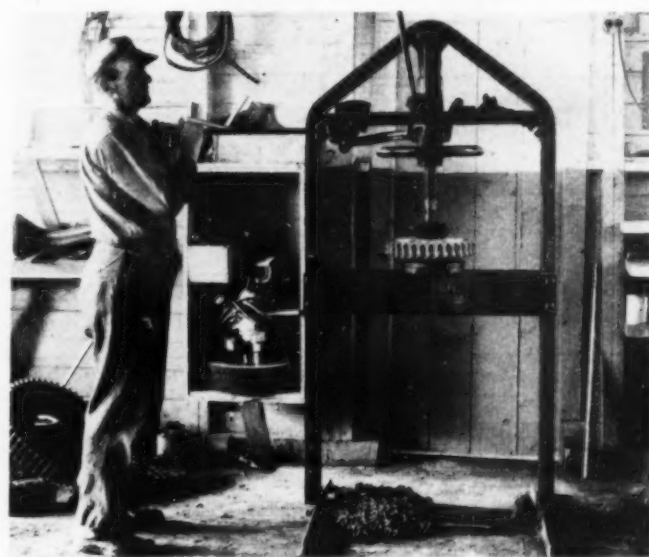
**REMOVING BROKEN CROSS-LINKS** from tire chains is one function of Weed tire chain press, used also to press new cross-links on tire chains.



**AFTER DRILLING AND REAMING** rivet holes in brake lining by use of electric drill on Riess brake lining machine, O. P. PROEHL, shop mechanic, presses heads on rivets by stepping on foot lever.



**FOR WELDING AND CUTTING** metals on many shop jobs (left), mechanics use Airco welding outfit with oxygen and acetylene tanks carried on hand truck.



**TO PRESS** bronze bushing into road machine gear wheel (right), mechanic operates Weaver Hi-Speed 32-in. press capable of exerting 28-ton pressure.

# Present and Accounted For~

A Page of

## PERSONALITIES

On New Jersey Approach  
To Lincoln Tunnel  
New York City



**"TOUGHEST ROCK** we've ever struck," says **JOHN DOHERTY**, general superintendent, B. Perini & Sons, Inc., Framingham, Mass., of excavation on New Jersey approach to Lincoln Tunnel. In 14 years with Perini organization, Mr. Doherty has directed operations on several large jobs involving heavy ledge cuts.



**AFTER 22 YEARS' EXPERIENCE** supervising work on projects such as Jersey City Medical Center, **ALFRED NELSON** at present is superintendent of construction for James Mitchell, Inc., Jersey City, N. J., on Lincoln Tunnel approach.



**IN CHARGE OF EQUIPMENT** for B. Perini & Sons, Inc., for last five years, **CHARLES PERINI** (left), keeps a sharp eye on operation and maintenance of heavy machines and small tools.

**BACKING UP** Superintendent Jordan on Poirier & McLane contract, Lincoln Tunnel approach (below), are: (left to right) **JOHN C. DECKER**, assistant superintendent; **JOHN H. REID**, assistant engineer; **WILLIAM FOENAR**, general foreman.



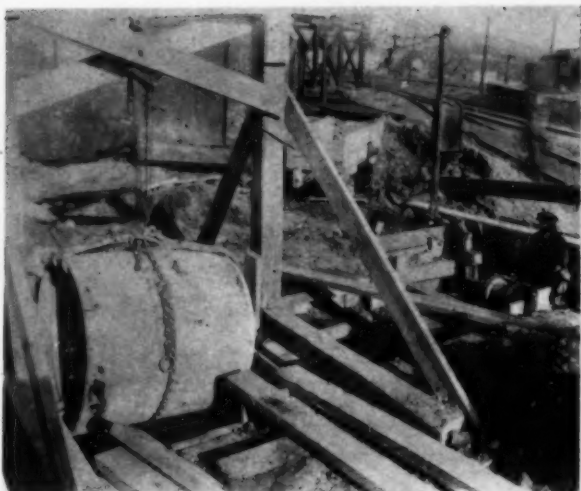
**ON THE MOVE** from morning till night, **EDWARD P. KELLY** (left), superintendent, in his ninth year with B. Perini & Sons, Inc., sets fast pace for Cost-Clerk **WILLIAM DI BERTO** and other members of executive staff on Lincoln Tunnel western approach contract.

**OVERPASS CONSTRUCTION** on Lincoln Tunnel approach in New Jersey is supervised for Poirier & McLane Corp., New York, contractor, by **JAMES P. JORDAN** (left), superintendent in charge of job.

Photos by R. A. Wargel





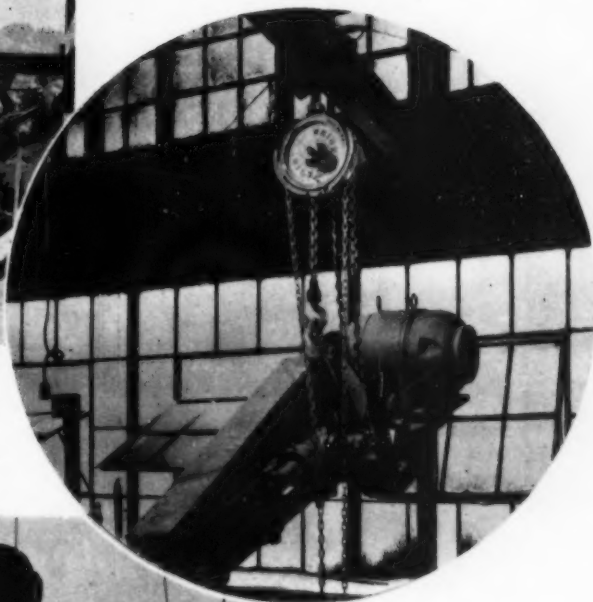


**SEWER PIPE** in precast concrete sections is handled to place in deep trench by cable from Sullivan "Turbinair" multi-purpose hoist, operated by compressed air.



**ELECTRIC HOIST** of 1-ton capacity proves useful in placing and removing concrete forms on building construction. Yale & Towne unit travels on overhead I-beam runway.

## HOISTS



**HEAVY MACHINERY** (above) is readily handled in shop by Wright improved high-speed, ball-bearing hoist and steel plate trolley on wall type jib crane. Portable grinder, carried by hoist, hangs entirely free except for tag line supplying current to motor.



**PILE PULLING** on construction job is handled by Yale & Towne spur-gear chain-hoist hung from wood A-frame rig straddling line of piling. Chain sling grapples top of pile to transmit pull of hoist.



**ALL-STEEL HAND HOIST**, mounted on wood A-frame, proves effective for lowering section of pipe line into trench. Two-speed Beebe unit, with capacity of 5 tons, weighs only 110 lb. and has only eight parts. Equipped with positive lockable brake and spring-operated holding dog.



**STONE FACING** (left) in building construction is set accurately by couple of masons using Yale & Towne spur-gear block.



**BACKFILLING** of trench for water pipe line in street is accomplished by scraper pulled by cable from Ingersoll-Rand air hoist mounted on portable compressor.

**HIGHWAY GUARD RAIL** (right) of wire cable type is stretched taut between anchorage posts by Yale & Towne 1½-ton "Pul-Lift" hoist. Manipulation of ratchet lever takes up slack in cable.



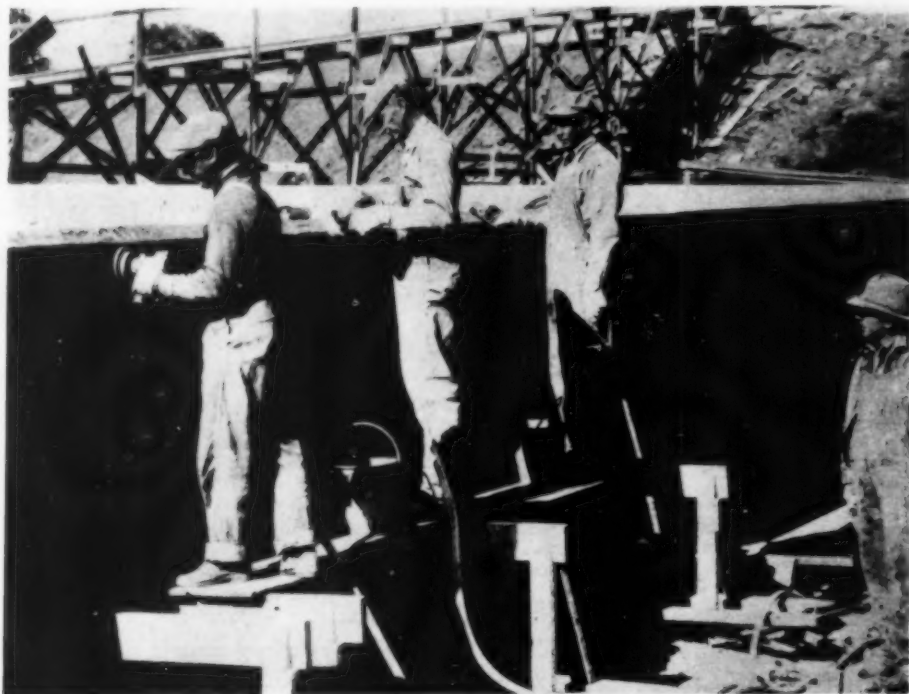
**HEAVY MINE CAR** is raised for repairs by Colting "Power Master" chain hoist, with convertible capacities from 1½ to 8 tons, using from single chain hookup to quadruple chain and double block. Free chain release for quick load adjustment. Expanding governor and brake.

# SMALL TOOLS ON CONSTRUCTION

# SURFACERS *and* GRINDERS



**CARBORUNDUM BRICK** equipped with handle is useful for finishing cement surfaces. Brick made by Carborundum Co. has fluted rubbing face.



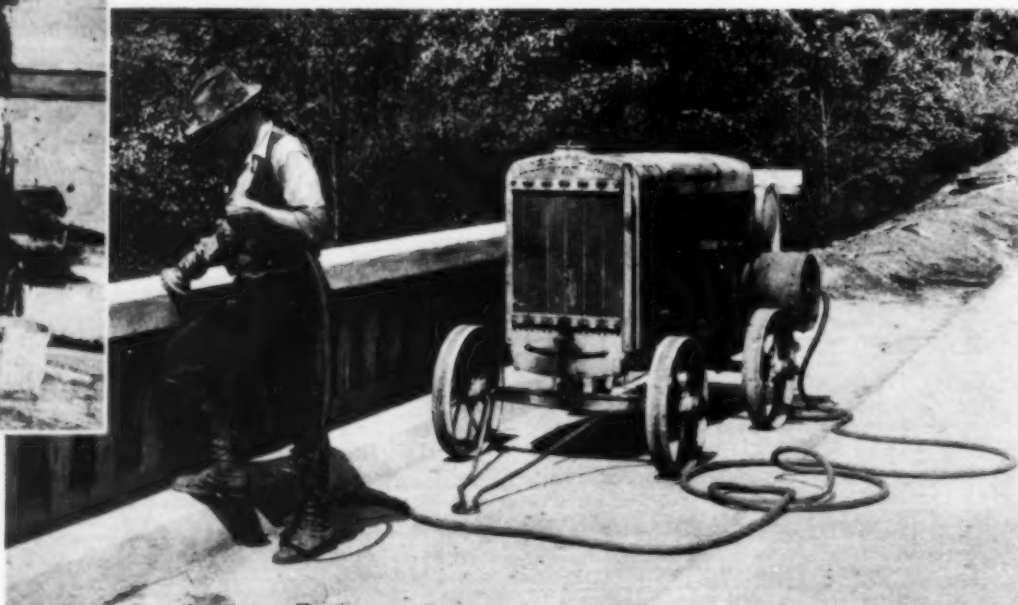
**CONCRETE WALL SURFACE** is smoothed by Thor pneumatic grinders, for removing form marks, smoothing up, beveling and rounding corners. This tool is adaptable also for polishing marble and granite.



**CONCRETE FLOOR FINISH (left)** is made by Kelley compactor float, equipped with two hammers striking 1,200 blows per minute as disk revolves. Floating action is supplemented by pounding, thus assuring dense, tight concrete.



**CONCRETE SURFACER**, of Mall type, is powered by 3-hp. gasoline engine. Models also available with electric-motor drive. Power is transmitted to revolving disk by flexible shaft.



**SMOOTH FINISH** on concrete bridge handrailing (**below**) is applied by Ingersoll-Rand machine powered by air from portable compressor.

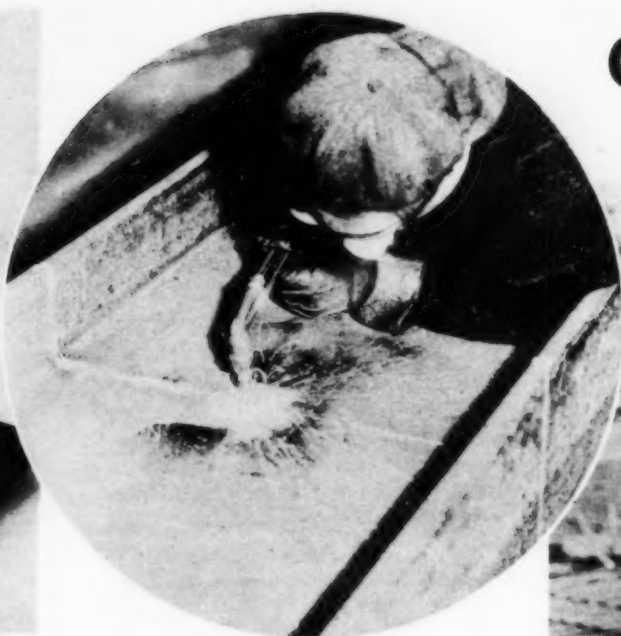
## SMALL TOOLS ON CONSTRUCTION



# CUTTING



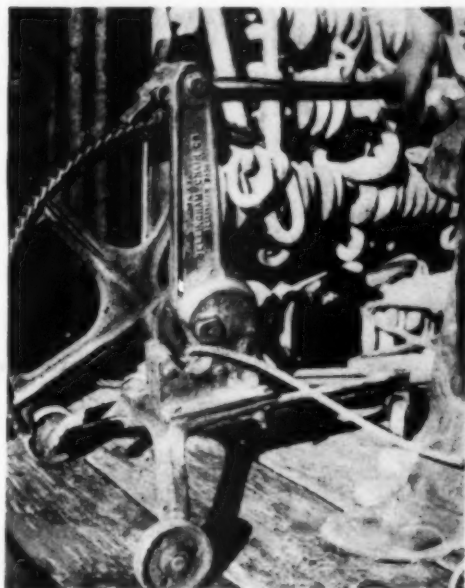
**WASHER PUNCH** is equipped with 18 hardened dies ranging in size from  $\frac{1}{8}$  to  $1\frac{1}{8}$  in. Device made by Ideal Commutator Dresser Co., is designed for punching washers and gaskets of fibre, steam packing, asbestos, leather, felt, cork, rubber and other materials up to  $\frac{1}{8}$ -in. thickness.



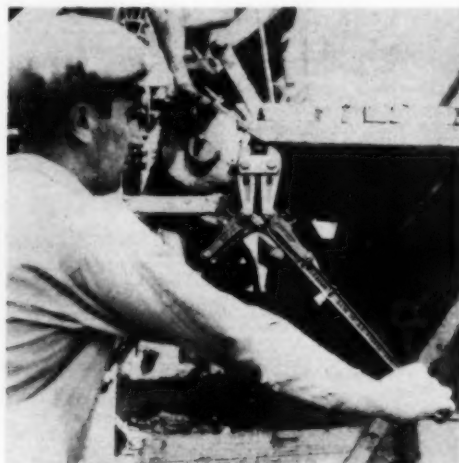
**CUTTING STRUCTURAL STEEL I-BEAM** is accomplished with Linde oxy-acetylene torch designed for heavy-duty field operations. This operator is cutting a 24-in. I-beam of metal  $\frac{3}{4}$  in. thick.



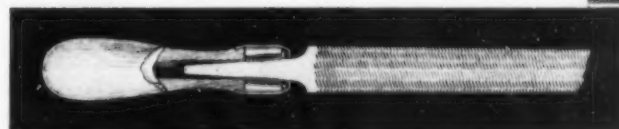
**HEAVY-DUTY CUTTER** of H. K. Porter manufacture shears steel rods for concrete reinforcement. Leverage principle multiplies, at cutting edge, hand power applied at handles. Will cut rods above  $\frac{1}{2}$ -in. diameter.



**WIRE ROPE**, at Grand Coulee dam in Washington, is cut by device manufactured by Bellingham Chain Co.



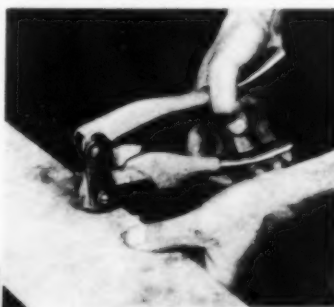
**NUT SPLITTER** is designed so that cutting edges remain separated sufficiently, after cutting, to avoid damage to bolt. H. K. Porter tool is adjustable for two sizes under maximum capacity.



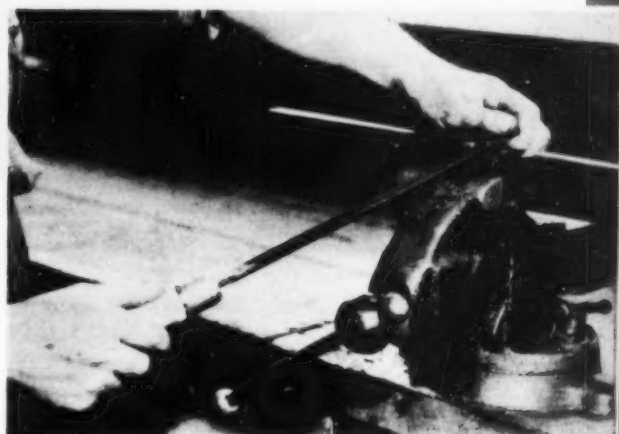
**FILE HANDLE** (above and below), designed by Parker-Kalon Corp., holds file firmly and cannot crack or split. Flexible steel die locked in handle cuts thread on tang of file as it is screwed on. Cannot come off unless unscrewed.

**TINNERS' SNIPS** (below), made by Crescent Tool Co., prove useful in cutting and trimming pipe for air-conditioning work.

**PORTABLE ELECTRIC SHEAR** (below) of Black & Decker manufacture cuts 16-gage sheet steel. Shearing action is accomplished by rapid reciprocating vertical blade acting against stationary horizontal blade. Will cut on radius as small as  $\frac{3}{4}$  in.



**METAL PUNCH** will produce holes up to  $\frac{1}{4}$ -in. diameter in 14-gage steel. Parker-Kalon tool, of toggle joint design, is 8 in. long and weighs  $2\frac{3}{8}$  lb. Furnished with seven punches and dies, from  $\frac{3}{32}$  to  $\frac{17}{64}$  in.



## SMALL TOOLS ON CONSTRUCTION

# SAWS



**TURNED OVER** on its back to serve as a table saw, this electrically operated Skilsaw cuts wedges for concrete form work on construction job. This example shows dual application of saw as stationary and portable cutting unit.



**POWER SAW** operated by compressed air is designed by Davey Compressor Co., for felling and bucking trees and for cutting timber piling on dock and other types of construction. Available in two sizes—24 and 36 in.—of which largest weighs 85 lb., has cutting stroke of 24 in. and consumes 90 cu.ft. of air per minute. Blade makes 185 strokes per minute. Saw frame is of lightweight steel tubing with heavy guides between which saw blade moves in non-sway strokes. Cross-cut blade is removable for replacement.

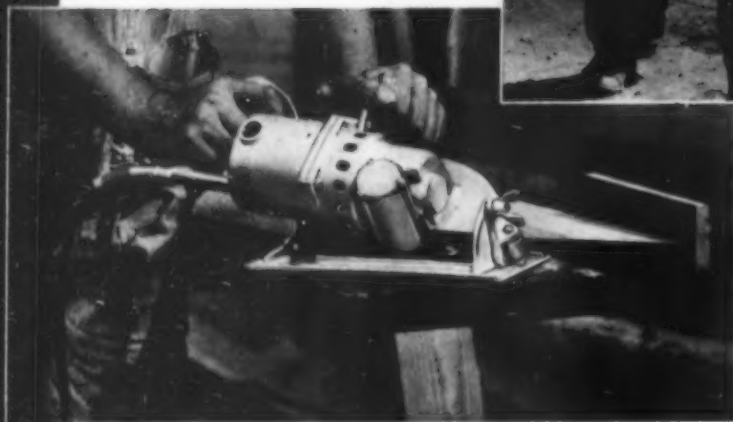
**HEAVY-DUTY CUTTING** is done by Wolf 24-in. air driven portable timber sawing machine, product of Reed-Prentice Corp. This saw cuts off tops of 14-in. wood piles in 40 sec.

**RIPPING OF FORM LUMBER (right)** is accomplished by Speedmatic portable electric hand saw, product of Porter-Cable Machine Co. Adjustable guide, running along outside edge of timber, holds saw to true line.



**CUTTING OF STONE**, tile, Transite and concrete may be accomplished by substituting abrasive wheel for standard circular saw in Skilsaw electric power unit.

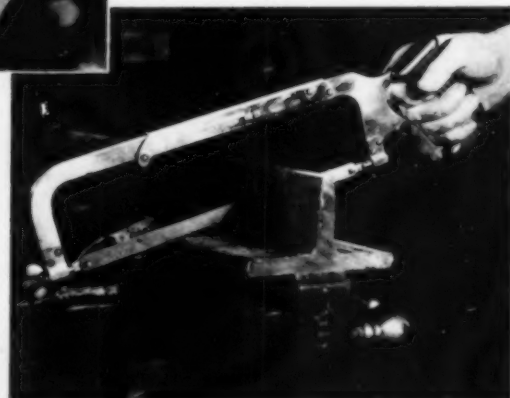
**BEVEL CUTTING (left)** at any angle from 0 to 45 deg. may be done by tilting saw table of Black & Decker portable electric unit with 7-in.-diameter blade. Telescoping guard covers blade at all times except when actually cutting.



**RAFTER CUTS** in house construction are made by setting base of Skilsaw to proper angle for this purpose.

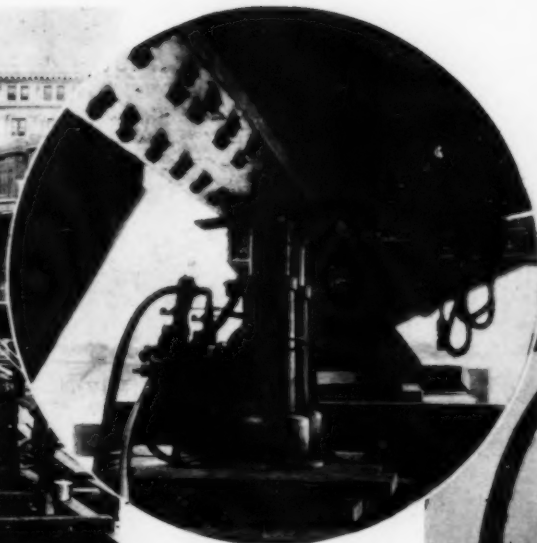


**HACKSAW BLADE (right)** of this Atkins tool is made of molybdenum steel for which advantages claimed are toughness and resistance to breaking strains in both machine and hand hacksaw cutting operations.

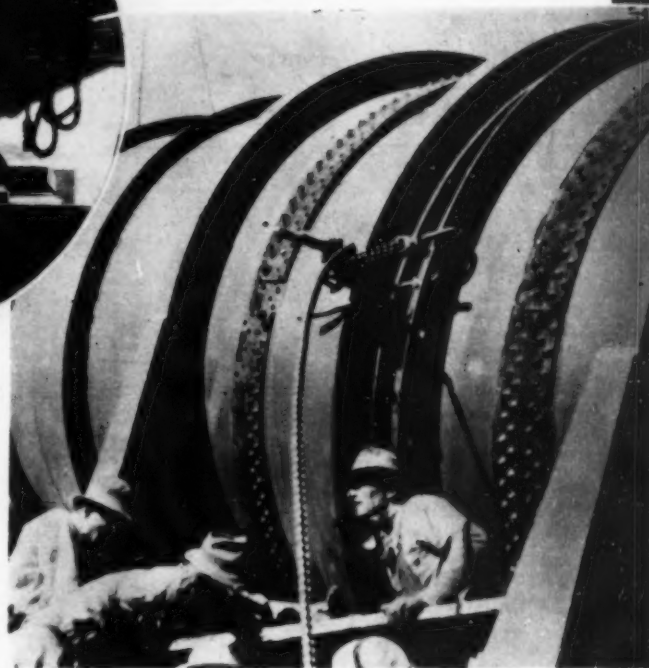




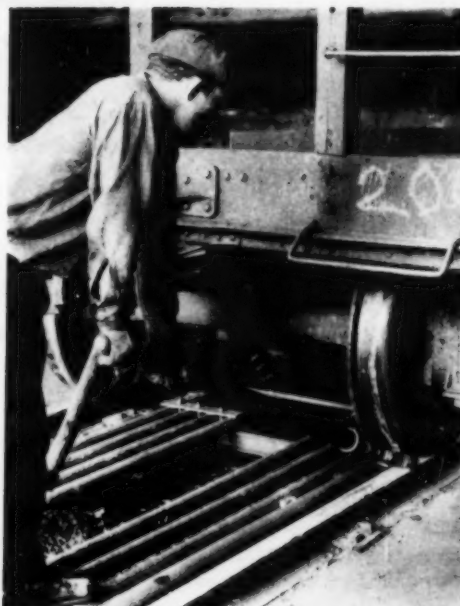
# JACKS



**AIR MOTORS**, eliminating manual labor, operate Joyce-Cridland jacks used on bridge construction in Joliet, Ill. These jacks, available in 50-, 75- and 100-ton capacities, operate on 90-lb. air pressure, and have rises from 13 3/4 to 30 in. Equipped with automatic shutoff at both lower and upper limits.



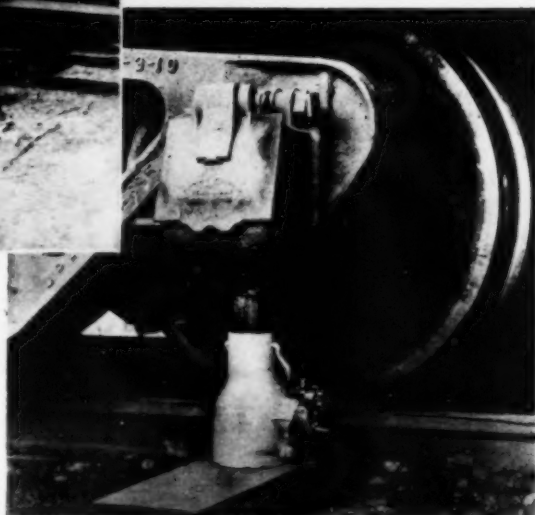
**MOVING OF TELEPHONE BUILDING** weighing 13,000 tons is done with aid of 18 Duff-Norton 100-ton crank lowering ball-bearing screw jacks. Structure in Indianapolis is raised, pivoted and moved 125 ft. to new location by Eichleay Engineering Corp., while routine procedure continues within building.



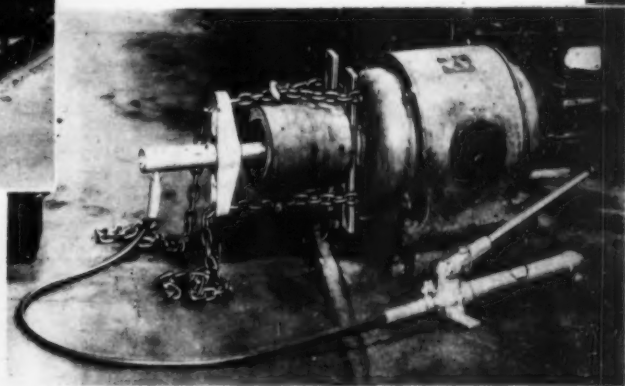
**RATCHET LEVER HOISTS** of Colling manufacture pull together and spot 30-ton sections of steel pipe prior to making joint. Load is always locked by sprocket and ratchet pawls. Reversible handle permits operation in any position. Capacities range from 3/4 to 15 tons and weights from 14 to 150 lb.



**TENSION** on tractor belt is obtained by bracing machine with Duff-Norton 15-ton general purpose jack, equipped with tilting base.



**CAR MOVER (left)**, operated by one man, is equipped with never-slip rail gripping spurs for spotting loaded gondola cars. Advance "Badger" unit, of alloy steel, has triple compound leverage, giving fast action. Nose of shoe and saddle toggle operate as unit.



**REMOTE CONTROL** is the feature of this Blackhawk hydraulic jack. Porto-Power unit, weighing 26 lb., has pump forcing oil under high pressure through 6-ft. length of hose to ram developing 10-ton push. Can be used to push, pull, clamp, bend or spread on construction and factory maintenance jobs.

**CAST ALUMINUM (left)** is the material employed for the housing of this Duff-Norton ball-bearing journal jack to insure light weight.

## SMALL TOOLS ON CONSTRUCTION

# FOUR Quality COUPLINGS

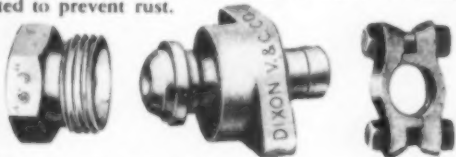
Guaranteed to End Waste Resulting from Blow-offs, Leaks and "Time-Out" for Repairs!



**"DIXON"**

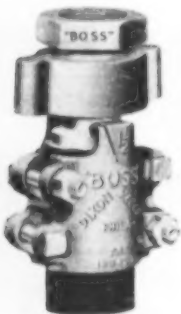
## AIR HAMMER COUPLINGS

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## "G J-DIXON" Ground Joint AIR HAMMER COUPLINGS

The most efficient coupling ever devised for air equipment. No leaking or lost washers. Soft-to-hard metal contact forms permanently tight seal, regardless of wear. Unusually strong and durable. Cadmium-plated—rust-proof. Furnished with either male or female spud.



**"BOSS"**

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**"GJ-BOSS"**

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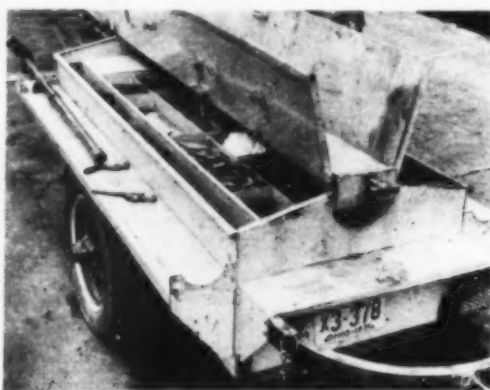
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Birmingham, Los Angeles and Houston

# Proper Selection, Use and Care of SMALL TOOLS

(Continued from page 35)

jacks, concrete surface grinders, vises, etc., could be obtained from the tool crib by depositing the conventional brass tool check with which each workman was provided at the time of employment. Procedure such as described, automatically makes for a safe job. A cold chisel is not an expensive item, but proper control and inspection of it with the resultant removal of burrs may prevent the loss of an eye. A cold chisel made of the proper grade of



**FOR MAINTENANCE** and construction work, Littleford trailer tool box mounted on pneumatic tires permits quick movement to job.

steel will do the job in half the time required by one made of reinforcing steel, the type carried by many workmen.

The operating condition of tools is a very vital matter. Kits in the possession of workmen should be inspected periodically and those in the cribs should be inspected each time they are returned by the workmen. Spud wrenches should be looked over for round corners that may slip off a nut. Pipe dies should be gaged for excessive wear. Chisels should be examined for burrs. Rope should be inspected to see that it is not weakened from contact with acid. Only through constant vigilance in this regard can accidents be kept to a minimum, and job efficiency maintained. Old and unsafe tools should be scrapped, and that means destroying them—not permitting them to be left where they can be picked up and used again, or taken home for use on another job.

It is quite common to hear the opinion that tools that are supplied workmen by the employer are abused. Generally that is not at all true. The majority of men will take pride in their kit and with a little decent encouragement will appreciate good tools and keep them in excellent shape. A man who keeps his tools in a sloppy condition is, in most cases, the same man who abuses safety rules. If bringing the matter to his attention does not correct this, it is better to let him go before the safety squad brings him to a first-aid station on a shutter.

### Housing of Small Tools

Providing proper tools means that a suitable place must be built to house them. Frank B. Gilbreth worked out a system of standard bins which

is generally applicable to most construction work. These are illustrated in the "Cost and Production Handbook," by Alford. Few jobs are large enough to warrant the permanent type of metal bin, but where they are warranted they are highly efficient. In any case, bins or cribs should not be more than 6 ft. high and the aisles should not be less than 3 ft. in width. General practice on most construction is to house these bins in a temporary shanty.

Tool standardization is a very necessary and important matter for many reasons. From the standpoint of initial cost the chance for quantity price reduction presents itself. Then there is the very vital factor having to do with interchangeability of parts, resulting in simple and quick replacement, and that of procuring the maximum use of a tool by building up usable items from good parts of discarded tools. In the matter of standardization it is always best to settle upon standard items that may be purchased in the open market because such tools manufactured by reputable firms generally give better service than do those made in the shop or selected because they have novelty value.



**TO HANDLE SHEETING** or piling and other heavy pieces, Yale & Towne spur-gear chain hoist supplies lifting power and easy manual control.

Equipment manufacturers have taken a long step forward in the standardization of heavy equipment. A great deal of progress also has been made in small tools. Progress has been outstanding in the standardization of shovel sizes and it is to be expected that this simple and obvious manner of reducing costs both to the manufacturer and the purchaser will be increased as time goes on. One has but to recall the confusion that once existed in



wheel-barrow sizes to appreciate the advantages of standards.

#### Maintenance and Repair

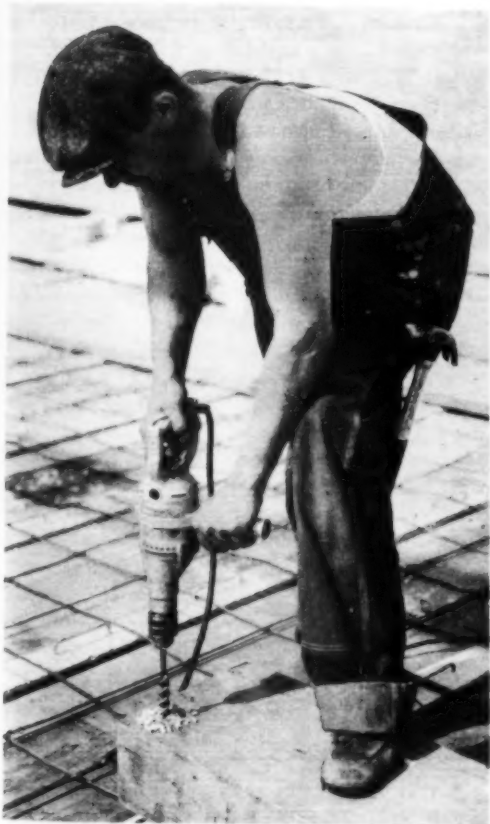
However, it is in the rapid and economical repair of tools that standardization plays its greatest part. In any case, it is the most appreciated by the men on the work. To be able to call at the tool crib for a replacement of a broken part, find it there, and discover that it fits and works when installed, is a matter that gives much inward satisfaction.

Repairs to tools are always a matter of annoyance unless the management has had the foresight to standardize on certain lines of tools, have spare parts lists always handy, and enough parts to keep the tools going. The efficient tool keeper will be careful to see that parts lists always are on hand, and that he follows instructions of the manufacturer when ordering the replacements. When ordering parts care should be taken that all requisite information is sent to the manufacturer. Certain forms have been approved for this purpose by the Joint Committee of Construction Equipment Manufacturers which it is well to use or follow. Much confusion may be eliminated by careful attention to this matter.

There comes a time in the life of most small tools when it costs more to keep them in repair than they are worth. In assisting in deciding when this time occurs, the manufacturer can be of distinct help. In the writer's opinion, most manufacturers do not take sufficient interest in following up this service to the contractor and many times use the inquiry to sell new tools rather than to repair the old ones. Some study might be given to this subject with advantage to both sides.

#### Performance Records

Performance records for small tools is a definite routine in the manufacturing industries. Upon



**BOLT HOLES** in heavy timbers are bored easily and accurately by portable Skilsaw electric drill.

this and other factors depends the selection of new and repeat purchases. Few contractors have work of such volume as to warrant maintaining the record. Where such a condition does exist they will be found most valuable and enlightening. Performance cannot be separated from maintenance.



**BOLTING BRIDGE MEMBERS** for reaming in yard assembly. Ingersoll-Rand air-powered impact wrench rapidly tightens nuts to desired bolt tension.

The contractor who will maintain low costs and reduce his loss on small tools, will insist on a regular monthly inventory and inspection. If the work being done is on some type of a cost plus basis, in which part of the tool expense is properly chargeable to the owner, it is very essential that this be done. A very simple form for this purpose is illustrated. Values at the end of the work may be chargeable to the job through establishing difference between "Value New" or "Present Value." The latter becomes the price which the next job pays for the tool on transfer to that work. The writer has made it a practice to depreciate small tools from 50 to 70 per cent of their value for each job.

Tools of today are much more efficient than is an organization's ability to take the fullest advantage of them. The problem of making a profit is not dependent so much upon the performance of tools available, as it is on the organization's ability to utilize existing performance to its fullest value. In very few cases is any tool on construction at work so continuously that its performance while operating is a vital factor. Greater than this is a tool's ability to operate and keep operating when needed, while being handled by workmen who are not too gentle in the manner or method by which they put it to work.

If a suggestion to tool designers is in order, it would be to lessen the stress on increasing operating efficiencies a few per cent to provide a talking point for sales, but to stress simplicity and sturdiness under all conditions. Sale of a tool that will always perform, no matter what the weather or job conditions are, will take care of itself. The workman on the job becomes a star member of the sales force.

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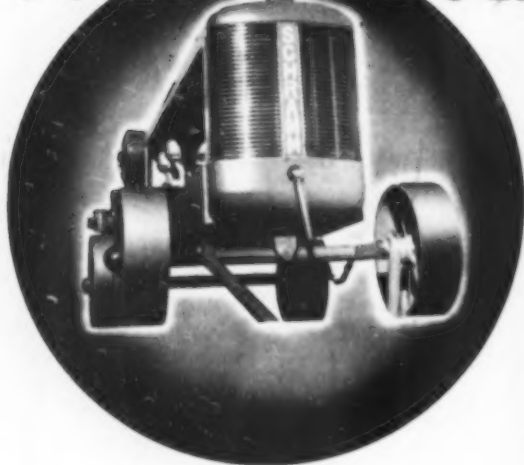
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## Nickel Alloy Steels for SMALL TOOLS

(Continued from page 43)

and straight peen hammers, the sledge hammer and many specially designed hammers for specific uses, such as the dinging hammer, a garage tool used for repairing dented fenders and other sheet metal parts. The characteristic desired in most hammers is the ability to impart a blow without denting or deformation of the head, spalling, breakage or other evidence of brittleness. In the case of the carpenters' hammer, breakage of or damage to the claw must also be avoided.

These properties can be obtained without difficulty by use of suitable nickel alloy steels. In certain cases where an exceptionally hard striking surface is required a case-hardened steel may be used. One toolmaker, for example, uses case-hardened nickel-chromium steel for ball peen hammers with complete success. Dinging hammers, due to their peculiar shape, usually fail by fatigue in the slender shank behind the head. The use of case-hardened steels has done much to minimize failures from this cause.

### Screwdrivers

Screwdrivers, like wrenches, are likely to encounter excessive abuse. A mechanic will frequently use a wrench on a screwdriver in loosening a rusted screw and he also has a tendency to use the tool for a cold chisel or a pry bar. Of course, screwdrivers are not intended for such service, but unfortunately the manufacturer's reputation is very likely to be measured by the degree to which his product will stand up under such rough treatment. Tool makers have met this problem by employing nickel alloy steels because these steels provide the necessary superior toughness and ductility at high strength and hardness levels.

For screwdrivers various steels may be used. In some cases certain sizes of screwdriver are hardened from cyanide to provide a superficial skin hardness for added resistance to scuffing. The selection of nickel alloy steels by several manufacturers has been based on performance in exhaustive tests against competitive materials.

Recently several methods have been propounded for effecting a more positive engagement between screwdriver and screw. One of the most successful of such devices is the Phillips screw developed by the American Screw Co. of Providence, R. I. The countersunk cruciform contour of the screw head, when mated with a corresponding male element, forms a junction in which slipping is virtually impossible. Since the screwdriver has no tendency to slip out of engagement under heavy stresses, the success of the plan depends largely on the ability of the tool to withstand high unit stresses and to be free from chipping or other deformation of the driving surface. The manufacturers insure the necessary dependability of making these tools of nickel alloy steel.

### Pliers and Nippers

Pliers and nippers constitute a class of tools which are required to perform a number of different operations. Jaws must be hard and wear resistant without being in the least brittle, handles must be strong and tough to resist the heavy bending stresses imposed and the cutting types must

possess superior cutting edges. The importance which is attached to satisfactory maintenance of the cutting edge is suggested by the severity of the tests included in a now pending Federal specification for pliers and nippers. It is here proposed that all types of nippers and pliers, except the non-cutting styles, be capable of cutting a certain quantity of high-strength plow steel wire, after which they shall cut paper as cleanly as a pair of scissors. In order to obtain the strength, hardness, toughness and cutting ability necessary for performance of this order many high grade pliers and nippers are made of nickel alloy steels, especially case hardened nickel-chromium steel and nickel-molybdenum steels.

Metal-cutting shears and clippers are tools which are similar in operation to pliers and nippers but are usually much larger and adapted to cutting thicker and more bulky materials. Nickel-chromium and nickel-chromium-molybdenum steels have proved excellent materials for the blades of such tools. Bending stresses imposed on the handles may become very high and certain manufacturers who do not employ nickel alloy steels for the blades have found it advisable to use these steels in the handles to avoid danger of failure at these points.

### Spades and Shovels

While carbon steel is an adequate material for ordinary hand shovels there are numerous instances where the service conditions are so severe that a higher grade tool is a distinct economy. Wear resistance is usually the prime requisite, but toughness, strength and lightness are also of importance. The strength-weight ratio is of particular interest since any attempt to increase strength by increasing the dimensions of the blade would throw the implement out of balance and prevent the user from obtaining maximum results for the effort involved.

After extensive tests two steels have emerged as suitable materials for meeting these requirements: nickel-chromium steel and nickel-molybdenum steel. The blades may be either forged or stamped from strip. Finished shovels when held by the blade tip in a vise and bent by the handle will spring back to the original shape without permanent set when the load is released. Although the first cost of such shovels is more than those made of ordinary steel, the life, according to circumstances, may be as much as 10 to 12 times longer and in use the edge remains sharp and does not turn up, thereby promoting greater efficiency. Nickel steel shovels are extensively employed for handling granite chippings, crushed stone, gravel, clay and other abrasive materials and for heavy duty service in mines, quarries and other difficult locations.

### Knives and Saws

Certain high carbon nickel alloy steels have been found the best available from the standpoint of ability to hold an edge and have, therefore, assumed an important position in the knife and

(Continued on page 64)



# Announcing The NEW ATLAS Water-proof GALVANOMETER

*Another ATLAS improvement*

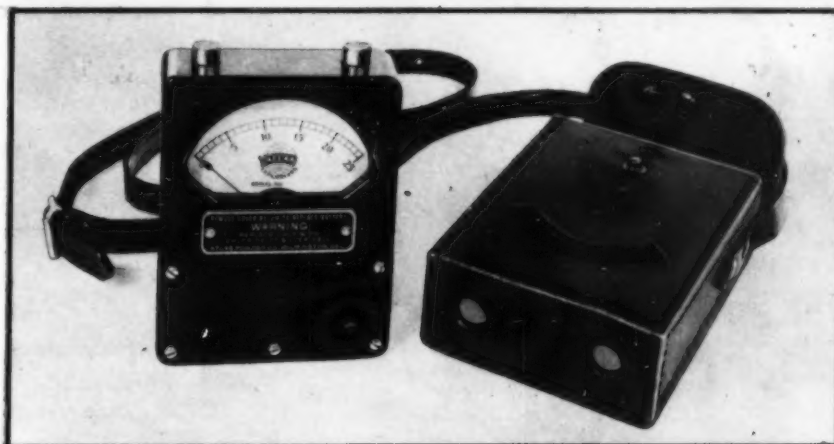
**G**ALVANOMETERS for testing electric blasting caps and electric circuits are precision instruments easily affected by water and moisture. It has often been necessary to dry out galvanometers each time they were used.

Now, Atlas announces a galvanometer, proof against moisture and water even under the extreme conditions sometimes found in large tunnels and shafts.

In addition to its resistance to water and moisture, the new Atlas Galvanometer offers these other advantages:

1. *Non-corrosive, lighter case.* Made of Bakelite the new case is not affected by acid mine water. Moreover, the new case makes the Atlas Galvanometer about 25% lighter and much easier to handle.
2. *Higher factor of safety—longer cell life.* Full scale deflection requires but 8 milliamperes of current.
3. *Separate cell compartment.* There is no need to expose the delicate mechanism to replace the chloride of silver cell.
4. *A newly designed cover,* in full-grain leather, gives increased ease of operation. You don't have to unbutton the flap when testing. The dial is read, right side up, through a slot in the case. The wires are held naturally against contacts at the bottom of the case.
5. *No increase in price.*

An outstanding development, the new Atlas Moisture-proof Galvanometer is of particular advantage to workers in large shafts, tunnels and other underground work where water conditions are often extreme. Ask your Atlas representative for full details.



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Knoxville, Tenn.  
Los Angeles, Calif.

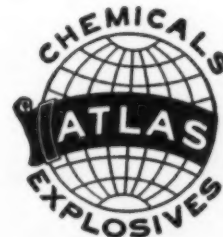
Memphis, Tenn.  
New Orleans, La.  
New York, N. Y.  
Philadelphia, Pa.  
Picher, Okla.

Pittsburg, Kansas  
Pittsburgh, Pa.  
Portland, Oregon  
Salt Lake City, Utah  
San Francisco, Calif.

Seattle, Wash.  
Spokane, Wash.  
St. Louis, Mo.  
Tamaqua, Pa.  
Wilkes-Barre, Pa.

# ATLAS

## EXPLOSIVES





# Need reinforcing bars in a hurry? We'll rush 'em to you!

Chances are good there's a Bethlehem warehouse right in your own territory. If so, delay will take a holiday when you want reinforcing bars in a hurry. Just phone in your order and the wheels will start turning promptly. Bars can be in the concrete in a matter of hours.

Bethlehem warehouses, located in key cities, are large, fully stocked at all times, staffed by men who know the importance of speed in getting bars to a job. They're ideally situated for fast shipping by rail or highway.

**BETHLEHEM STEEL COMPANY.** General Offices: Bethlehem, Pa. District Offices: Albany, Atlanta, Baltimore, Boston, Buffalo, Chicago, Cincinnati, Cleveland, Columbus, Dallas, Detroit, Honolulu, Houston, Indianapolis, Johnstown, Pa., Kansas City, Mo., Los Angeles, Milwaukee, Nashville, New Haven, New York, Philadelphia, Pittsburgh, Portland, Ore., St. Louis, St. Paul, Salt Lake City, San Antonio, San Francisco, Savannah, Seattle, Syracuse, Toledo, Tulsa, Washington, Wilkes-Barre, York. Export Distributor: Bethlehem Steel Export Corporation, New York.

## BETHLEHEM STEEL COMPANY



## Nickel Alloy Steels for SMALL TOOLS

(Continued from page 62)

cutlery field. Similar steels, containing from 0.75 to 1.10 per cent carbon, make excellent wood saw steels and are widely used in high grade band and circular saws. Particularly useful for saws is a 2-per cent nickel steel containing about 0.80 per cent carbon. The addition of the nickel increases wear resistance and provides additional strength, toughness and fatigue resistance which minimize danger of chipping, cracking or tearing out of teeth.

### Lifting Jacks

Lifting jacks, whether of the geared, chain, hydraulic, lever or screw types, constitute a field in which the superior qualities of the nickel alloy steels are used to particular advantage. The benefits obtained are indicated in the following statement contributed by F. J. Jakoubek, chief engineer of Templeton, Kenly & Co. of Chicago.

"In the railroad, oil, mining, construction and practically all industrial fields, jacks are among the most widely used of mechanical devices, being indispensable to repair and installation work. It is true that they are subject to abuse in being forced, occasionally, to withstand loads well beyond their rated capacities, and being called into service under conditions which concentrate heavy stresses upon parts of the mechanism. Hence it is necessary that the vital parts be built of materials able to resist arduous service conditions.

"Industrial demands for heavier capacity jacks with minimum weight allowances necessitated changing steel specifications from carbon and low alloy steels to higher grade materials. Our Simplex jacks, conforming, now use nickel steel compositions. This is no particular economic hardship, since the cost of materials is a relatively minor factor. All working parts are heat treated, using gas-fired furnaces and accurate pyrometric equipment. Oil or water quenching is used depending upon the analysis in question. Where toughness and wear resistance are requisites, due to constant severe use and extreme climatic conditions, the nickel alloy steels are employed for safety, dependability and economy.

"The journal type Simplex jack, illustrated herewith, is built to permit higher safe overloads due to the application of nickel alloy steels. Their resistance to wear and fatigue provides a service life of from three to four times that of carbon steels. Tests proved that properly heat-treated nickel and nickel-chromium steels used in this application withstand the extra stresses very satisfactorily, bearing up under abuse, resisting wear and shock, and providing extra safety."

**BUILDING MAINTENANCE PRODUCTS — The Skybryte Co.** Cleveland, Ohio. (16 pp., illustrated). Catalog devoted to better maintenance of metal, concrete, wood, glass and composition surfaces. Presents color chart, recommends colors for use in home and factory and describes and lists applications of various paints, enamels and varnishes, including Rust-Tox for painting directly over rust, and Skyco, heat-resisting aluminum paint. Other products listed and described: No-Glare window coating, factory glass cleaner, Seal-Tread varnish, Stone-Kote for damp-proofing and stain-proofing concrete, stucco, cut stone, cement block, brick and marble, and wet-wall basement paint.



## NEWS FROM MANUFACTURERS *About Their Products*

*The publications reviewed below, will keep you posted on latest developments in construction equipment and materials available for your use.*

**PORTABLE AIR COMPRESSORS — Davey Compressor Co., Kent, Ohio** (57 pp., illustrated.) Complete details of company's line of air-cooled compressors, accompanied by more than 100 photographic illustrations of applications of units. New equipment announced for first time includes parallel mounted trailer models offered at standard prices. Auto-Air units, Davey power take-off compressors, are listed for a large number of trucks. World's largest tractor-mounted compressor, a 420-cu.ft.-per-minute unit, is illustrated among others designed for tractor mounting. Other new products described are a pneumatic saw and a pneumatic log splitter.



**BASES FOR PAVEMENTS — Solvay Sales Corporation, 40 Rector St., New York City** (14 pp., illustrated). Booklet called "Better Bases for Better Roads" is prepared for highway executives planning new pavements and interested in design and construction of bases. Answers numerous questions in regard to various types of bases discussed in highway circles such as: "What are their advantages?" "What is the best type of base?" "What do they cost?" "Is their expense justified?" "Have they proved successful?" Presents facts regarding use of stabilized graded bases along with specifications and recommendations on materials.

**AIR-COOLED COMPRESSOR — Sullivan Machinery Co., Michigan City, Ind.** (20 pp., illustrated). Describes and illustrates Unitair stationary and semi-portable air compressors. A number of refinements and improvements have been made to this line of compact, two-stage, air-cooled compressors, including the addition of a larger size (435 cu.ft. per minute displacement), the use of force-feed lubrication and the design of a simplified automatic stop and start control for motor driven styles. The current Unitair compressor is available for displacements ranging from 107 to 435 cu.ft. per minute and for commercial pressures up to 125 lb. per square inch.



**GRADE AND HAUL CALCULATOR — R. G. Le Tourneau, Inc., Peoria, Ill.**—Slide rule device simplifies computation of production and cost data on earthmoving with 12-yd. carryall scrapers hauled by tractors. Covers hauls up to 1 mi., various grades and pay loads from 7 to 32 cu.yd. with different scraper and tractor combinations. Expected deliveries per hour. Maximum haul distances and time of trip.

**ARC-WELDING MANUAL — Hobart Bros., Troy, Ohio.** (218 pp., illustrated; price 50c.) Course of lessons in arc welding as used in Hobart arc-welding school, covering information on 40-volt arc welding technique. Subjects include preliminary instructions, 42 practical exercises, striking and manipulating the arc, welding with bare electrodes, welding and cutting with coated electrodes, welding light-gage steel.

**WELDER'S "TROUBLE SHOOTER" — Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.** (8 pp., 3 1/2 x 6 1/2 in.) This 8-pp. booklet lists the common troubles met by welders, together with the cause and cure for each. Some of the troubles mentioned are: distortion, welding stresses, cracked welds, undercut, porous welds, brittle joints and corrosion.

## How The Other Fellow Did It — *by Dig'n Digger* *a review of records made by contractors*



**Sack Bros. contractors say:**  
"handles very nicely  
and is economical"  
on \$275,000 Olean, N. Y.  
Sewage Disposal Plant

The new 3 million gallon sewage disposal plant at Olean, New York, designed by Nussbaumer & Clark of Buffalo and built under the direction of D. W. Brown, Resident Engineer, includes a sewage pumping station, 2 storage tanks, 1 sludge pumping station and 2 open sludge drying beds.

A sizable plant nestled in the hills of Western New York where Sack Bros., contractor of Bemus Point moved in their new BAY CITY Crane equipped with 35' boom to handle excavation and steel setting. Satisfactory service from the first swing of the bucket. "Handles very nicely and is economical" — that's the report of J. M. Sack who adds praise for the self locking worm boom hoist which topped everything else in setting steel.

The ease of operation, speed and precision experienced on this job is another testimonial for standard BAY CITY design which provides for proper balance and synchronization of operating speeds. High swing speed is possible through the dependable, sturdy swing gear with wide heat expelling clutches. Swing pinion, specially heat treated and Brinell tested for toughness withstands the terrific impact of constant "stop and go" operation and rides on internal ring gear with true rolling motion. Unit cast nickel manganese steel revolving table and lower carbody eliminates unnecessary dead weight but retains the advantages of one piece castings by successfully absorbing shock and vibration.

Many other distinctive features are described in "COMPARE" booklet which is yours for the asking—just write BAY CITY SHOVELS, INC., BAY CITY, MICHIGAN.

"Advertisement"

## "TRIMO-ALLOY" PIPE WRENCH

**SAFETY  
IS  
THE  
FACTOR  
TRIMO**

Trimo-Alloy Safety Steel Wrench in use on gas vent line where a slip or a break means a 35 foot fall. Ordinary tools aren't good enough for a risky job like this.



**TRIMO DROP-FORGED PIPE-CUTTER  
TWO TOOLS IN ONE**



SPECIFY "TRIMO" WHEN ORDERING FROM YOUR SUPPLY HOUSE

MADE AND GUARANTEED BY

**TRIMONT MFG. CO.  
ROXBURY, BOSTON, MASS.**

## How to Select and Use WRENCHES

(Continued from page 45)

### Direction of Pull

Adjustable wrenches can be pulled in either direction for light loads, but develop their greatest strength when the pressure of the hand is applied to the same side of the wrench (Fig. 8) that carries the fixed jaw.

Adjustable wrenches of all kinds are valuable conveniences but are inherently less safe, because of the human element, than are solid open-end



Fig. 9 . . . **RATCHET WRENCHES** should be oiled frequently to keep mechanism in free working order.

wrenches, box and socket wrenches. When they must be used in risky pulling positions caution is necessary. Inspect them occasionally for cracks in the web of the sliding jaw, observing that jaws are not spread out of parallel and that portions of the adjusting worm are not partly sheared off, or indented. A sudden and serious failure may result if such defects are present.

Ratchet wrenches should be frequently oiled (Fig. 9) to keep the mechanism in free working



Fig. 10 . . . **MONKEY WRENCHES** develop greatest strength when pressure of hand is applied to side on which hammer face projects.

order and to combat wear of the moving parts. Wear is surprisingly rapid, although the mechanism operates at slow speed, and is attributable to the intense pressures which are generated upon the small areas involved. Don't expect a worn ratchet to have the same strength as a new one.

Screw or monkey wrenches will develop satisfactory strength only when the pressure of the hand is applied to the side of the wrench on which the hammer face projects. (Fig. 10.) When pulled in the wrong direction such a wrench will slip and can be ruined with relative ease.

The correct way to pull a 90-deg. open-end wrench is identical with the correct use of monkey wrenches; the jaws should be aimed in the direction of the pull.

Wrenches are not intended for use as hammers. Their use as such is not only bad shop practice, but is liable to damage wrench efficiency as well.

### Chain Tongs

In the use of chain pipe wrenches, properly called "tongs", the best gripping position is that which is midway of the jaw teeth, or rearward therefrom. The bending of the tong handle under load is not evidence of a defect. Such bending is intended to act as a warning and "safety valve" in advance of breakage of chain, which would incapacitate the wrench.

In flat-link chains on tongs, an occasional inspection of the first two or three rivets and links adjacent to the swinging, or anchor, link should be made, since the load is greatest at that point. Badly bowed, or curved rivets indicate that the chain has been loaded almost to the breaking



Fig. 11 . . . **WRENCHES**, when not in use, belong on wall panels or in tool boxes.

strength and is probably unsafe. In cable-link chains the links give warning by stretching and pulling "rigid" if the breaking point is approached.

Stillson-type or hook-jaw pipe wrenches will also be found to grip and serve best when the bite is taken midway of the jaw teeth, and when the size of the wrench is properly chosen for the job in hand. Jaw teeth should be kept in good operating condition to allow quick, one-hand grip and release.

Where does a wrench belong when at rest? It does not belong much above eye-level, preferably below it. It should not lie on the ledge of a machine where it is apt to fall off into working machinery and cause damage. It should not lie carelessly on platforms, beams, or high places from which it may fall and injure men below. It should not be thrown from high places. Wrenches belong on benches, shelves, wall panels (Fig. 11) or in tool boxes in an orderly arrangement which makes it easy to find the right and safe wrench when you want it.



Did you have  
**"AN EDGE"**  
in your bid?

The contractor who owns Cummins Diesel powered dump trucks has the edge of job-test evidence . . . low dirt-moving costs.

He knows his Cummins Diesels will not let him down. He knows they will start instantly in any weather . . . no costly delays to men or machines. He knows they will not eat up their savings in expensive service and repair parts. Cummins Engine Company, 1713 Wilson Street, Columbus, Indiana.

**"JOB-TEST  
EVIDENCE"**

Contractors Wachter, O'Neill and Megarry, Bismarck, N. D., use these Cummins Diesel powered Euclids on the Fresno Dam on Milk River in Montana.



**CUMMINS**  
*Dependable*  
**DIESEL**

PIONEER IN MODERN DIESEL DEVELOPMENT

# EASY TO READ!



## NEW MODEL NEW LOW PRICE!

THIS newest member of a famous family offers all the Wyteface advantages at a popular price. The black-on-white graduations are easy to read, even in dim light. The smooth white surface—permanently bonded to the steel—protects the line from corrosion and rust. A new resilience makes this improved steel tape hard to kink and hard to curl, greatly increasing the useful life of the line. The case is of sturdy leath-erite, and all mountings are heavily nickel plated.

Favorite Wyteface comes in 25, 50, 75, and 100 ft. lengths, sold by hardware and building supply dealers. Send the coupon below for an illustrated folder and complete prices.

EST. 1967  
**KEUFFEL & ESSER CO.**

NEW YORK • HOBOKEN, N. J.  
CHICAGO • ST. LOUIS • SAN FRANCISCO • DETROIT • MONTREAL

LOOK  
FOR THIS  
DISPLAY



**K & E FAVORITE  
WYTEFACE**  
STEEL MEASURING TAPES

KEUFFEL & ESSER CO., Dept. 18, Hoboken, N. J.  
Send illustrated folder and complete prices on Favorite Wyteface.

Name .....

Address .....

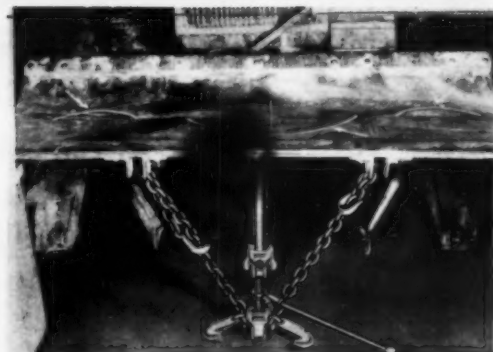
## SMALL TOOLS ON CONSTRUCTION JACKS



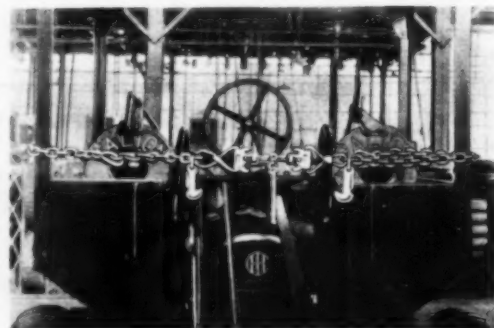
**ALUMINUM ALLOY** insures light weight for rail bender and rail punch, products of Utility Mine Equipment Co. Operated by one man, bender handles rails as heavy as 60 lb., while 40-lb. rails can be punched with lightweight rail punch.



**LOWERING JACK** of 15-tons capacity, a Duff-Norton tool, is utilized to realign table of rotary drill at Allison Park, Pa., where Herndon Drilling Co., of Tulsa, Okla., goes to new depths in an attempt to strike gas.



**STRAIGHTENING** of bent bulldozer blade is accomplished by pushing with Simplex push-and-pull jack, designed by Templeton, Kenly & Co. for a wide variety of maintenance, repair and production jobs. Ratchet mechanism permits speedy operation in close quarters. Operation of jack may be reversed by half turn of reversing plunger. Made in four sizes with screw travel ranging from 4 3/4 to 12 3/4 in., and weight from 11 to 15 lb. Application of jack is extended by use with chains, pipes, sky hooks and other attachments. Rated capacity is 10 tons.



**IN UNDERPINNING** for New York subway Simplex jacks are used for placing heavy steel girders.



**PULLING IN** cab of tractor grader, badly distorted by accident, is type of work ideally suited to Simplex push-and-pull jack, here shown exerting pull, as contrasted with pushing operation on bulldozer blade, illustrated at top of this column. For pulling operation makers furnish heat-treated, chrome-nickel sky hooks to engage any link of 1/2-in. heat-treated chains and insure centralized pulling. For maintenance operations the following special set is recommended: Push-and-pull jack, sky hooks, three-way base or wheel-puller attachment, spreader jack (operated by wrench), 1/2x40-in. chains with grab hooks and claws, chisel pointed lever bar, stud links and tool box.



# Speaking of "Small" Tools...

the BIG name is

# LOWELL

## Reversible Ratchet Wrenches

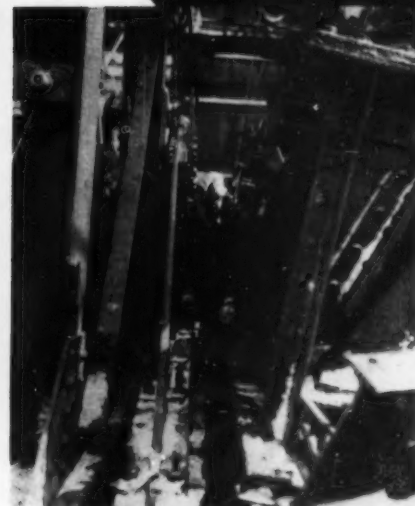
● Around construction work we find the Lowell Steel Socket Bridge Wrenches classified as the dependable tool for the job.



● Up in the air they must have dependable tools and that is why this man is using a "LOWELL"



● In the tunnels like under the Hudson River bolting heavy parts calls for husky dependable wrenches. That is why "LOWELLS" were chosen.



● Where brute strength is needed and small space provided "LOWELLS" prove their worth.

*Briefly* — if you want the Reversible Ratchet Wrenches that can "take it"—and do the work they're made for—and protect the men who use them—the word is "LOWELL". There's a Lowell Wrench in every size from 6" to 6 feet. Send for descriptive Catalog R.



● Much time is saved by using Lowell Reversible Ratchet Wrenches where nuts are continually tightened and loosened like on come along clamps.

# LOWELL WRENCH COMPANY

W O R C E S T E R , M A S S .



## PRIMACORD simplifies Main Line Connections

Square knot shown above is employed in the Main Line only, when connecting two pieces of Primacord-Bickford. Spliced Primacord should not be used in bore holes.

More work from explosives... better fragmentation... less moving of equipment... quicker removal of broken material. Would you also like to speed up operations while increasing safety and dependability... cut down expenses and bank more dollars? Then you need Primacord-Bickford, the improved detonating fuse for modern blasting, because it is...

**INSENSITIVE** to friction, fire, or ordinary shock.

The Ensign-Bickford Co., Simsbury, Conn.

PR12

**PRACTICALLY INSTANTANEOUS**, yet affords relief of burden.

**EFFICIENT**—gets maximum results from explosives.

**ECONOMICAL** in loading time and effort.

**LIGHTWEIGHT**—only 15 lbs. per 1000 ft.

**EASY** to handle and hook up.

Send for full details, contained in the free Primacord Booklet.

Makers of Cordeau-Bickford Detonating Fuse

# PRIMACORD-BICKFORD *Detonating Fuse*

**Safe!** THIS NEW "SAFETY" WIRE ROPE CLIP WON'T SLIP  
MADE BY LAUGHLIN OF DROP FORGED STEEL

The LAUGHLIN "Safety" Clip has two gripping faces.



The New LAUGHLIN "Safety" Clip marks the first improvement in clips for 25 years. U. S. Government tests gave 95% rope efficiency with two clips. No rope deformity; no crimping or twisting of the wire; no chance of installing clips incorrectly as in the case of old style clips.

Now available in all standard sizes, hot galvanized after threading. Send for report of comparative tests of holding power of LAUGHLIN "Safety" Clip (Patented) and ordinary U-Bolt clips.

For over 70 years this company has specialized in designing and manufacturing drop forged industrial and marine hardware. Its products enjoy an unsurpassed record for dependability.

All types and sizes of drop forged steel hooks, shackles, turnbuckles, sockets, bolts, links, and other fittings.

SEND FOR CATALOG

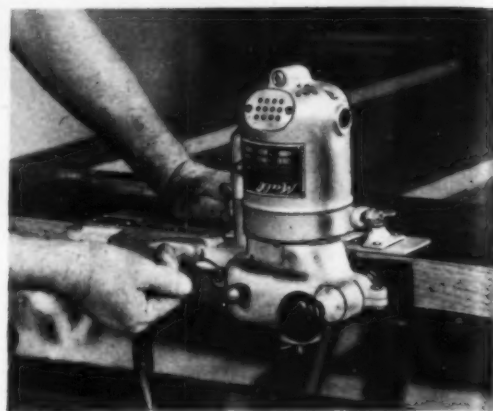
**THE THOMAS LAUGHLIN CO.**  
PORTLAND, MAINE, U.S.A.

Manufacturers of Industrial and Marine Hardware Since 1861

New York Chicago Detroit New Orleans  
Los Angeles San Francisco Seattle Denver

## SMALL TOOLS ON CONSTRUCTION

### SAWS



**ELECTRIC DOOR PLANE**, a Mall portable tool, fitted with spiral cutter, provides means of fitting sash and transoms and planing any surface up to 2 1/4 in. wide. Gives smooth finish either with or across grain of wood. Can be set to predetermined bevel. Close adjustment of cutting depth from 0 to 1/8 in. Has aluminum frame and weighs 10 1/2 lb.



**SAFETY SAW**, electrically driven, has cutting capacity of 3 1/4 in. Tilting base enables Stanley machine to make bevel cuts up to 45 deg. in 2 1/2-in. material. Equipped with stationary and swinging guards which keep cutting edge of blade covered at all times, affording protection to operator.

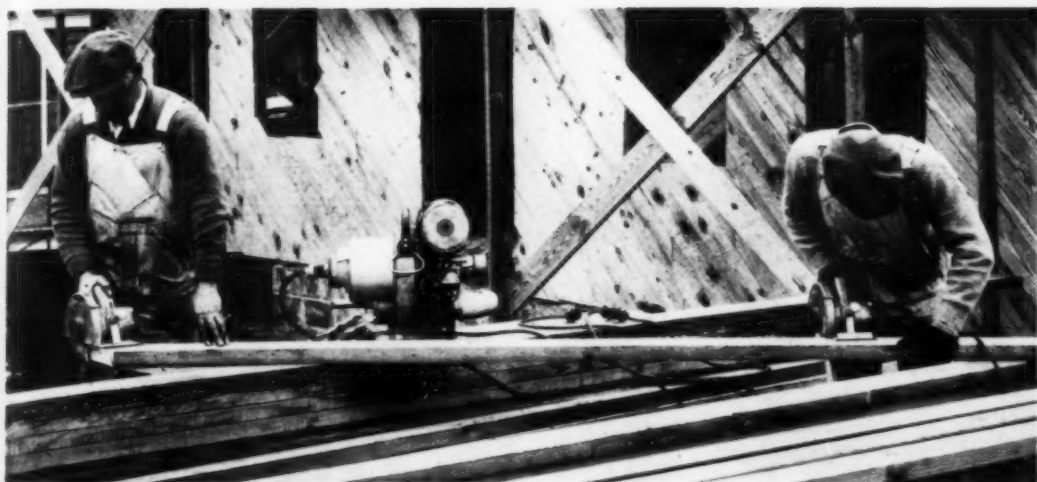


**AIR-OPERATED SAFETY SAW** trims ends of planking on construction job. Made by Ingersoll-Rand Co. in two sizes of saw blade, 8- and 12-in. diameter. Metal guard protects operator at all times. Cross-cut, rip or combination blades can be supplied. Special blades are available for cutting stone, tile, metal and other hard materials.

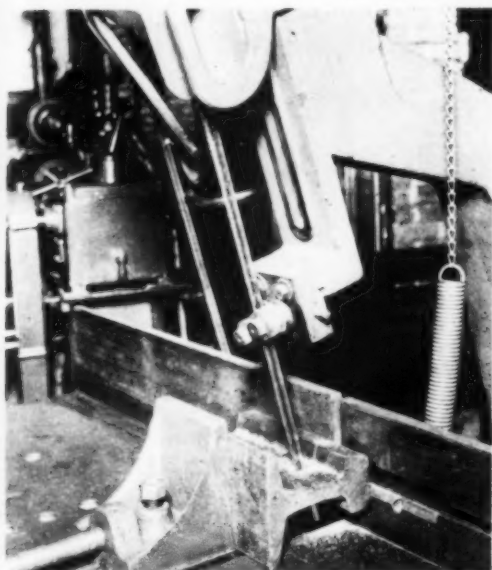


## SMALL TOOLS ON CONSTRUCTION

### SAWS



**HOUSE CONSTRUCTION** is speeded up by use of portable electric saws operated by Homelite 1,250-watt portable generator, driven by gasoline engine. Light weight of generator enables it to be moved readily about job by one man.



**CUTTING OF STEEL RAIL** is job which W. O. Barnes band saw is designed to handle. Saw band is  $\frac{3}{4}$  in., 12 pitch.



**ELECTRIC DOOR LOCK MORTISER** cuts complete lock barrel and face plate in one operation. Height rod and self-centering clamps of Mall machine speed up work. Mortise is cut by motor-driven revolving hand-led cutter which is moved up and down the face by operating hand crank. Maximum length of lock mortise, 9 in.; maximum length of face plate mortise,  $10\frac{1}{2}$  in.; maximum depth of mortise,  $5\frac{1}{8}$  in. Net weight is 35 lb.



**SAW RIG**, belt-driven by gas engine, is perched 65 ft. above tracks of Erie Railroad in Weehawken, N. J. Poirier & McLane Corp., New York contractors, use this American outfit for form lumber and other major cutting jobs involved in building New Jersey approach to Lincoln tunnel under the Hudson River. — Photo, R. A. Wurgel.



**Built to  
Keep Your  
Air Tools  
Busy!**



## GOODALL "SUBWAY" AIR HOSE

You'll run no risk of breakdowns, delays and tied-up equipment, once you put "SUBWAY" on the job! Its reputation for long, trouble-free service on concrete breakers, rock drills, riveting hammers, chipping hammers and all other air tools, guarantees a *low ultimate cost* that means a *better profit* every day your air equipment is used.

The ability of "SUBWAY" to "take it", inside and out, is the result of GOODALL'S 33 years of specialization in building special purpose hose. Perfectly balanced construction insures *equal life and efficiency* for tube, carcass and cover, under the most severe working conditions . . . no failure of *one part* necessitating scrapping of hose while remainder is still good.

The next time you order Air Hose, specify "SUBWAY" . . . the Red Air Hose that has made GOODALL the *buy-word* of so many contractors, everywhere!

*In the meantime, write for sample*

**GOODALL RUBBER CO.**  
5 S. 36th ST., PHILADELPHIA, PA.  
New York • Pittsburgh • Chicago • Cleveland • Houston  
FACTORY: TRENTON, N. J.  
**GOODALL MECHANICAL CORP.**  
San Francisco • Los Angeles • Seattle  
Salt Lake City • Phoenix

**GOODALL**

The originators of the  
Standard of Quality Line  
(Reg. U. S. Pat. Off.)  
of contractors rubber goods



# "WOLF" Portable Timber Saws

## economically cut Heavy Timbers



Four examples from hundreds are shown here which save time and money.

Available in: A.C. Electric

110 or 220 volt 60 cycle 3 phase

Air Driven

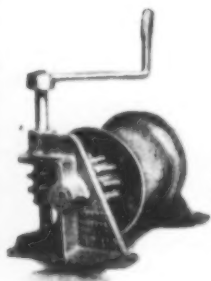
Chicago Pneumatic or Ingersoll-Rand motors

Capacities: 16"—24"—36" and 48".

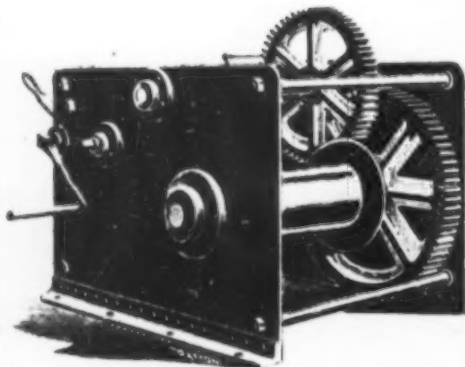
(self contained gas engine driven type in development for later announcement)

REED-PRENTICE CORP., WORCESTER, MASS., U. S. A.

## DOBBIE WINCHES



A Dobbie Winch for every purpose.  
From 100 pounds to 50,000 pounds capacity on a single line.  
*With ease and safety.*



**Dobbie Foundry & Machine Co.**  
Niagara Falls, N. Y.

Other Dobbie Products—Steel Barrieks, Timber Derrick Fittings, Hand Winches, Motor Driven Winches, Blocks, Sheaves, etc.

YOU CAN **EXPECT MORE** FROM A **STANLEY ELECTRIC TOOL**



*for Heavy Construction Work!*

Tough jobs are easy for the W-9 Stanley Safety Saw. Powerful, heavy duty motor assures fast-cutting even at the full 3 1/4" cut. Its rugged design and precision balance make it easy to use in any position. Heavy oversize worm gears are sealed in grease chamber—ball bearings throughout. Tilting base permits accurate bevel cuts up to 45° through rough 2 1/4" lumber; Positive Safety Guard covers blade at all times.

For Heavy timbers—railroad ties, bridges, scaffolding, Stanley makes the CC16—biggest, most powerful portable electric saw made—only saw on the market that takes a 6" depth cut. Fast-cutting, it will zip through oak 6 ft. long, 6" thick, in 1 1/4 minutes! Stanley Electric Saws also available in 6", 7", and 12" sizes. Stanley Electric Tool Division, The Stanley Works, 140 Elm St., New Britain, Conn.

ASK YOUR DISTRIBUTOR FOR A DEMONSTRATION OR WRITE TODAY FOR DESCRIPTIVE CATALOG

**STANLEY ELECTRIC SAWS**

"COST LESS PER YEAR"

## SMALL TOOLS ON CONSTRUCTION

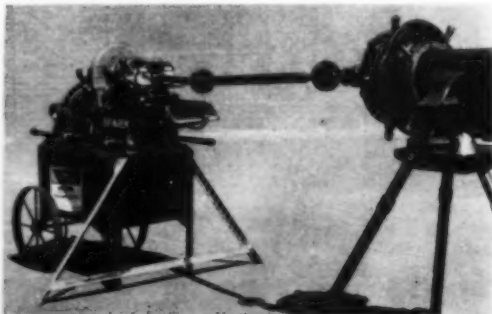
### PIPE TOOLS AND VISES



**WATERWORKS MAINTENANCE TRUCK** is fitted on rear end with pipe vise facilitating cutting and threading of pipe and application of fittings.



**POWER VISE STAND** is designed to thread 2-in. pipe with receding type stock and dies. The pipe in this Oster unit is gripped in a universal, brace-operated, scroll type chuck and is revolved by power unit in upper part of stand. When power is turned on, sliding arms in stand take torque of pipe tool as threading, cutting or reaming operations are performed. Without legs, which are removable, net weight of stand is 110 lb.



**CUTTING AND THREADING** of pipe from 2 1/2 to 12 in. in diameter is done with this Beaver portable pipe and bolt machine, equipped with drive shaft and geared tools. For threading large pipe, machine is equipped with anchor frame, as illustrated.



# Move Dirt the Smart Way—



## with CONTINENTALS

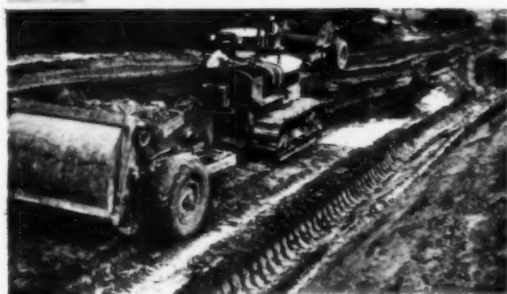
It's the smart way because you can move dirt faster and at a lower cost per cubic yard with Continentals. It's the smart way because Continentals move more dirt per shift than bigger, more cumbersome rigs that cost a lot more money.

It's the smart way judging from the lowered dirt moving costs enjoyed by hundreds of Contractors, Counties and State and Federal projects. May we present facts and figures on what Continentals are doing for their owners?

Made in 4, 5, 7 and 10 yard sizes on low pressure tires or crawlers. Continentals are sold and serviced by Allis-Chalmers dealers everywhere.

### MOVING DIRT THE SMART WAY!

Top left: 7 yard and Allis-Chalmers Model "L" back-dumping over a culvert, as only a Continental can do it, on an Iowa County trunk. Top right: Cincinnati contractor saves \$97.00 per house, grading streets and alleys on a Covington, Ky., private housing project using a 4 yd. Continental and an A-C "WK" Tractor. The Continental Be-Ge Pump Unit powers both scraper and bulldozer. Bottom left: Two 7 yd. Continentals cutting costs for a contractor on the Marshall-Henderson Highway in Rusk County, Texas. Bottom right: 7 yard and A-C "LO" graveling a ranch-to-market road near Adamsville, Texas.



### DIG!

A twist of the wrist on the control lever. Full weight of scraper plus all the tractor power on digging blade. Dirt rolls in, up and over onto front apron. Full loads in a few seconds!



### HAUL!

While it digs and loads it's on its way to the dump. They turn short. Loading, hauling and dumping are a continuous cycle. No waste motion—no waste effort!



### DUMP!

They back-dump like a truck, on the run—over a bank, against a wall, loads spotted where wanted. They back without zigzag, eliminate bulldozing and spread, grade and level, too!



### CONTINENTAL ROLL & STEEL FOUNDRY COMPANY

Tractor Equipment Division  
14370 Railroad Avenue, East Chicago, Indiana

# CONTINENTAL WAGON SCRAPERS



**A PROFITABLE**



**DAY'S WORK**



**BID THE  
Buckeye  
WAY**  
ask for our  
operation data  
before you  
bid

**EVERY DAY**

Excavating machinery pays its owner in proportion to its workability, adaptability and stamina—but most of all because of the way it “handles.” Operators soon become expert in handling the Clipper—its action in response to the Vacuum Control Levers is positive, accurate and dependable.

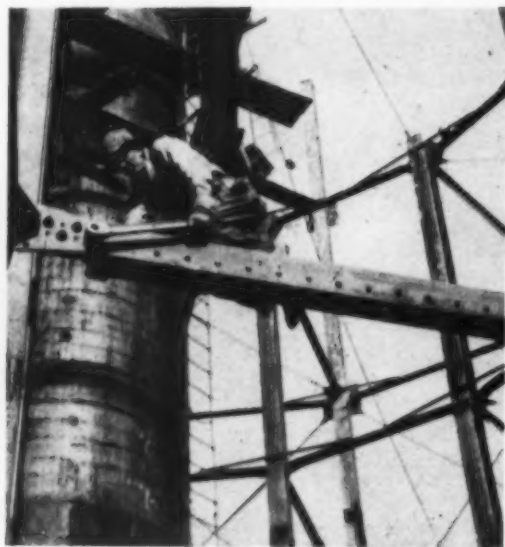
**Buckeye  
Clipper**

**CONVERTIBLE  
EXCAVATORS**  
with “MEVAC” Trade Mark  
Registered  
**METERED VACUUM CONTROL**

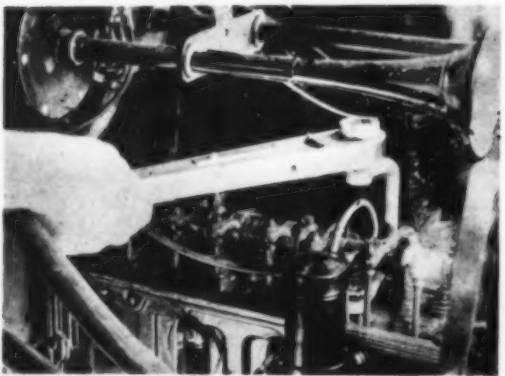
**THE BUCKEYE TRACTION  
DITCHER CO. ... FINDLAY, OHIO.**

**1 1/2 YD.  
5/8 YD.  
3/4 YD.**

## SMALL TOOLS ON CONSTRUCTION WRENCHES



**REVERSIBLE RATCHET WRENCH** of socket type is used to turn up heavy nuts on steel tank erection. Socket of Williams drop-forged tool has hole extending clear through so that nuts may be tightened on any length of bolt. Made in five sizes, 24 to 53 in. to handle both hex and square sockets from 1 to 4 3/8 in.



**TORQUE-INDICATING WRENCH** made by Bonney Forge & Tool Works shows operator how much pressure he is applying when tightening nut. Operation illustrated is that of tightening cylinder head bolts on automobile engine using wide sweep box wrench attachment.



**STILLSON WRENCHES** are used by men of George Brewster & Sons, contractors, to make up 2-in. pipe line serving job on approach to Lincoln tunnel.



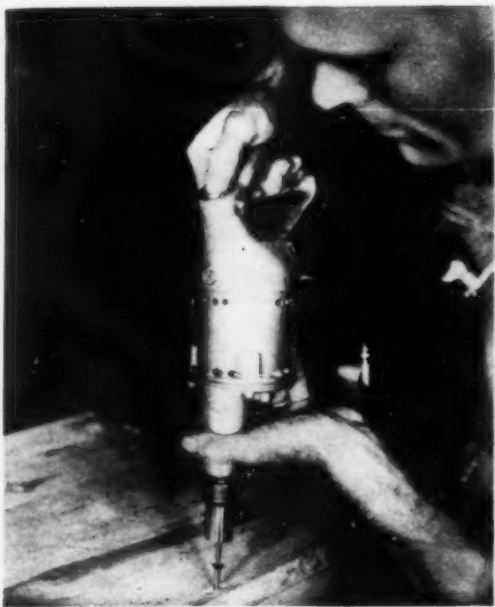
**STRUCTURAL WRENCH** is used in erecting steel frame that was bolted, not riveted. Made in a wide size range to accommodate up to 1 1/4-in. U. S. Standard nuts, these Williams wrenches are popular among structural steel workers.

**IN A SINGLE UNIT (left)** are combined this Williams stand, vise and pipe bender. Vise handles pipe from 1/8 to 2 in.; bender handles pipe up to 3/4 in. Chain pipe tongs illustrated, handles pipe and fittings from 1/4 to 2 1/2 in.



## SMALL TOOLS ON CONSTRUCTION

### DRILLING *and* BORING



**SCREW DRIVER** handles No. 12 wood screws or building construction. Thor tool weighs 6 lb., operates at 400 r.p.m. and handles either No. 12 wood screws or 1/4-in. metal screws.



**HOLES FOR CONCRETE FORM SPACER RODS** are bored with Stanley brace and Mills Falls 7/8-in. bit



**DRILLING** on road construction job near Springfield, Vt., is done by Sullivan featherweight drill rig carried on frame with pneumatic-tire mounting.



SINCE  
1774

THE SHOVEL  
THAT BUILT  
AMERICA

# Perfect Balance

in

# Genuine O. Ames SHOVELS

Like an automobile the weight of a shovel must be low hung. Its balance depends on the proportion of weight below the center line of the handle. The famous Ames bend gives this pioneer Plain Back its perfect hang or balance. Often copied but never equalled. There's a reason—Specify Genuine O. Ames and watch shoveling costs come down.

ASK YOUR JOBBER

**AMES BALDWIN WYOMING CO.**  
PARKERSBURG, W. VA. NORTH EASTON, MASS.



O. AMES  
RED EDGE  
PONY  
BALDWIN  
KNOX-ALL  
BRONCO  
MONONGAH  
HUSKY  
PEERLESS  
3-STAR  
PINNACLE  
2-STAR

# No "Dead-Head" Metal Rides in WILLIAMS *Buckets*

• Williams Buckets don't rely on sheer mass and dead weight for digging power and stamina. Williams welded construction cuts down weight without sacrifice of power and durability.

Williams power mechanisms give the bucket tremendous digging ability. They bite quickly and deeply to get full capacity loads — they work faster — get the job done quicker because you are moving dirt — not inert metal.

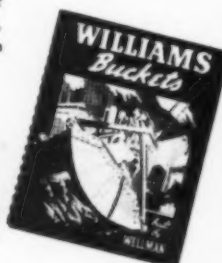


**THE WELLMAN ENGINEERING CO.**  
7917 CENTRAL AVENUE • CLEVELAND, OHIO

The Williams line includes Power Arm, Multiple Rope, Power Wheel, Single Line Hook-On, and Dragline Buckets.

Tell us the condition, and we'll send you **FREE**, a special bulletin describing the specific Williams Bucket best fitted to the job.

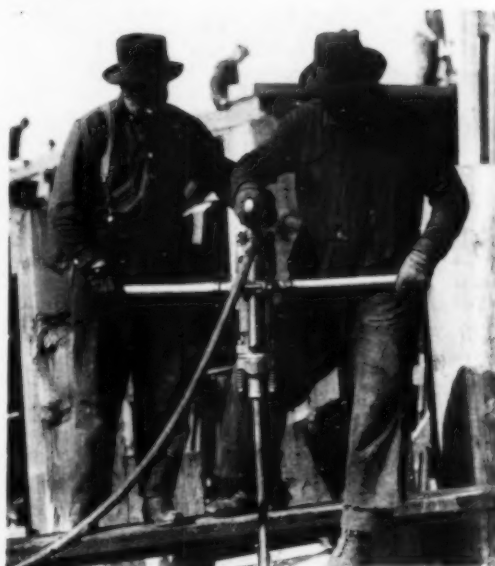
Distributors located in all parts of the country are competent to render valuable field service.



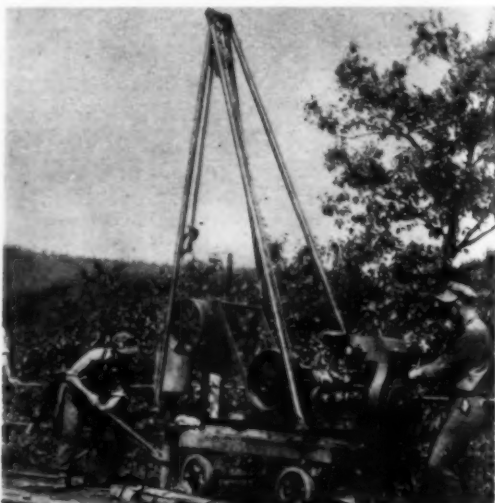
**built by WELLMAN...**

## SMALL TOOLS ON CONSTRUCTION

### DRILLING and BORING



**DRIFT BOLTS** are driven by Ingersoll-Rand pneumatic tool capable of boring 1½-in. holes.



**CORE DRILL RIG** made by Acker Drill Co. is powered by 5-hp. air-cooled engine and equipped with hoisting winch and rotary core drill. Drop weight of 300 lb., operated as piledriver, forces 2½-in. steel casing into overburden. After bedrock is reached, rotary drill recovers solid cores.



**BOLT HOLES** in armored traffic plate for bridge floor are drilled with Ingersoll-Rand pneumatic tool.



*Mall*  
**PORTABLE  
ELECTRIC  
TOOLS**

*Lower  
Costs!*

#### TOOLS FOR EVERY CONTRACT PORTABLE DRILLS

Heavy and light duty types. ¼" to ¾" capacities.

#### DOOR LOCK MORTISERS

Mortises 45 to 50 doors per hour. Cuts complete lock barrel and face plate mortise at one time.

#### ELECTRIC HANDSAWS

For general construction and maintenance work. 2-¾", 2-½", 3-1½", and 4-½" capacities. All with swivel bases and adjustable for depth of cut.

#### ELECTRIC DOOR PLANES

An accurate method for fitting sash, transoms, and doors. You can plane and fit ten times as many doors with this modern tool and do a better job, too!

**DETAILED BULLETINS  
AND PRICES ON EACH MALL  
COST-CUTTING, LABOR-  
SAVING  
TOOL WILL BE FURNISHED  
UPON REQUEST**

**Mall Tool Company**  
7757 SOUTH CHICAGO AVENUE CHICAGO, ILL.



**Easier  
speedier  
pipe threading...**

Rugged new **RIDGID** No. 65R All-Steel-Malleable Alloy Die Stock, with drop-forged hardened tool-steel cam plate, **Threads 4 sizes of pipe with 1 set of chaser dies. Your choice of 2 new mistake-proof workholders.**

New strength and durability throughout. Quick automatic setting to size saves time and chaser expense. Two speedy workholders, both practically automatic — no bushings. A modern super-efficient tool you'll take workmanlike pride in. Buy it—for quicker easier better threading at lower cost. Ask your Supply House.

**THE RIDGE TOOL CO., ELYRIA, O.**

**RIDGID PIPE TOOLS**



New **RIDGID** No. 65RC with cam type workholder.



New **RIDGID** No. 65RP with plate type workholder.





*An 18 mile sample*

of the low-cost roads Illinois is building—with TEXACO



(Large photo) Completed section of new low-cost plant-mix surface constructed with Texaco SC Surfacing Material on 18-mile Federal Aid project in Fayette and Montgomery Counties, Ill.

(Small photo) The mix in the above 18-mile project was spread by machine.

Illinois realizes that for many miles of its highway system, the logical, economical surfacing is Low-cost Asphalt Construction.

This 18-mile Federal-Aid project in Fayette and Montgomery Counties, Ill., illustrates what Illinois has accomplished this year on a substantial mileage of its roads with TEXACO Asphaltic material. The machine-spread surface, 2½ inches thick, was plant-mixed, using approximately 300,000 gallons of TEXACO SC Surfacing Material No. 7. Supporting this tough, non-skid, resilient surface is a gravel base.

For information on any phase of Asphalt street and highway work, request our nearest office to send you a Texaco Field Man.

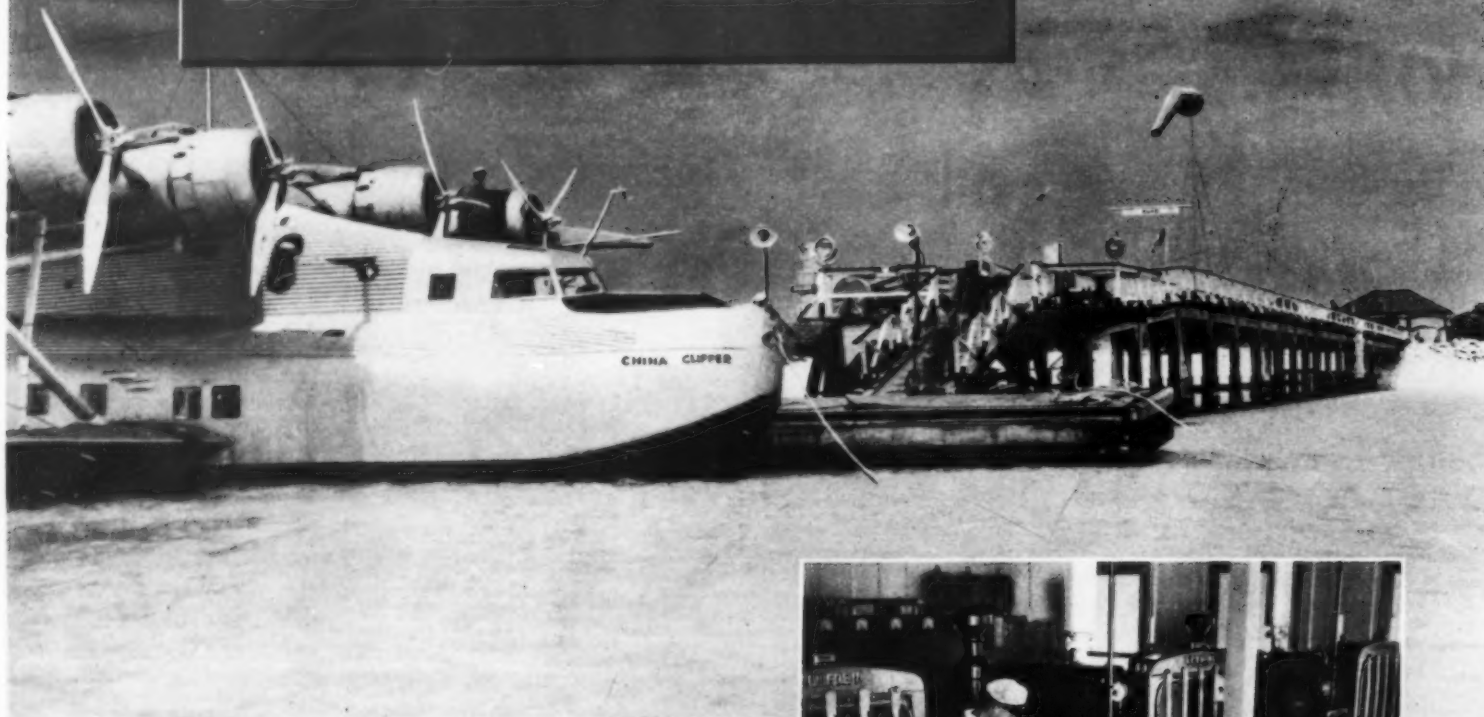
**TEXACO**  
 *asphalt*

THE TEXAS COMPANY  
 Chicago Cleveland Kansas City

Asphalt Sales Department  
 Philadelphia Houston Dallas

135 E. 42nd St., New York City  
 Jacksonville Buffalo Richmond Boston

# Establishing MID-OCEAN BASES FOR GIANT CLIPPERS



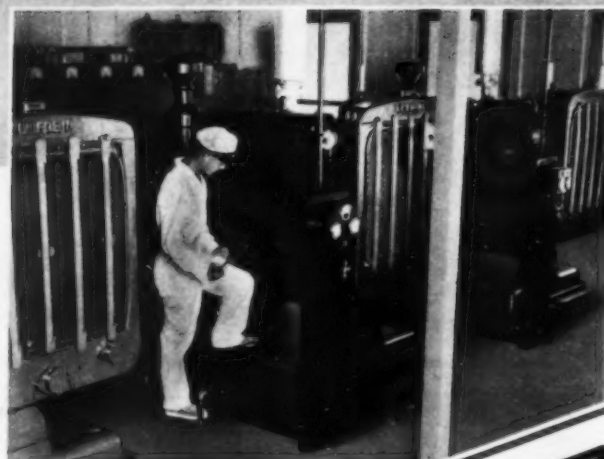
Approximately four thousand miles from San Francisco, as the Clipper flies, a Pan American Airways pilot makes ready to land! Whether at Midway Island (near the International Date Line) or at Wake (due west of Hawaii) he glides his Clipper Ship via radio beam down to a safe landing! Here on these tiny isles in Mid-Pacific, now important outposts of the future, he prepares to conquer the rest of the world's largest ocean!

**D**ESOLATE sand spits in 1935 — today Wake and Midway Islands are as modern as America. Electric lighting, automatic refrigeration, modern water supply and radio communication — all are there!

And Diesel engines, lubricated with "RPM" Diesel Engine Lubricating Oil, have helped bring about this miracle of modernization.

Naturally Pan American Airways demands absolutely unfailing lubrication for stationary Diesels and "Caterpillar" tractors at its mid-ocean outposts. "RPM" Diesel Engine Lubricating Oil delivers just that — at low cost, too. No gummed valves — no ring sticking — no carbon trouble after 57,000 hours of "RPM" service! No wonder Pan American's verdict is "very satisfactory!"

Try "RPM" Diesel Engine Lubricating Oil in your "Caterpillar" Diesel units. See why Pan American uses it *exclusively*.



# RPM

REG. U.S. PAT. OFF.

## DIESEL ENGINE LUBRICATING OIL

Approved by  
CATERPILLAR TRACTOR CO.

# STANDARD OIL COMPANY OF CALIFORNIA



**RPM**  
DIESEL ENGINE  
LUBRICATING OIL

**A truly modern oil that does more than lubricate perfectly**

On construction jobs, in power plants, in the woods and on the farm, "RPM" Diesel Engine Lubricating Oil is helping Diesel tractor owners to earn more profits.

It is made to prevent ring-sticking, reduce non-operating hours and end overhauls for carbon removal. When drained it removes dirt and carbon which it holds in suspension.

If your equipment is "Caterpillar" Diesel, this is your oil. "RPM" Diesel Engine Lubricating Oil is distributed by the following companies under the brand names indicated:

#### IN THE UNITED STATES

##### "RPM" Diesel Engine Lubricating Oil:

THE CALIFORNIA COMPANY (Montana only)  
THE CARTER OIL COMPANY, Tulsa, Oklahoma  
HUMBLE OIL & REFINING COMPANY  
STANDARD OIL COMPANY (Indiana)  
STANDARD OIL COMPANY (Inc. in Kentucky)  
STANDARD OIL COMPANY (Nebraska)  
STANDARD OIL COMPANY OF CALIFORNIA  
STANDARD OIL COMPANY OF TEXAS  
UTAH OIL REFINING COMPANY

##### Diol "RPM" Diesel Engine Lubricating Oil:

COLONIAL BEACON OIL COMPANY, INC.  
STANDARD OIL COMPANY OF LOUISIANA  
STANDARD OIL COMPANY OF NEW JERSEY  
STANDARD OIL COMPANY OF PENNSYLVANIA

##### Signal "RPM" Diesel Engine Lubricating Oil:

SIGNAL OIL COMPANY

##### Sohio "RPM" Diesel Engine Lubricating Oil:

THE STANDARD OIL COMPANY (Ohio)

#### IN CANADA

##### "RPM" Diesel Engine Lubricating Oil:

IMPERIAL OIL COMPANY LIMITED  
STANDARD OIL COMPANY OF BRITISH COLUMBIA LIMITED

#### THROUGHOUT THE WORLD

"RPM" Diesel Engine Lubricating Oil is also available through distributors in more than 100 other countries.

Get in touch with your nearest distributor—for a clean engine, and long hard service with the minimum of overhaul.

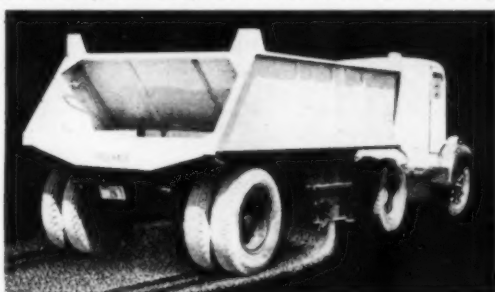
**WORLD-WIDE ACCEPTANCE**

**SWEAT PAD** for industrial and construction workers consists of 13/4x7-in. strip of du Pont cellulose sponge with one-piece Latex headband, named Allsafe "Drybrow." Has high sweat absorption properties.



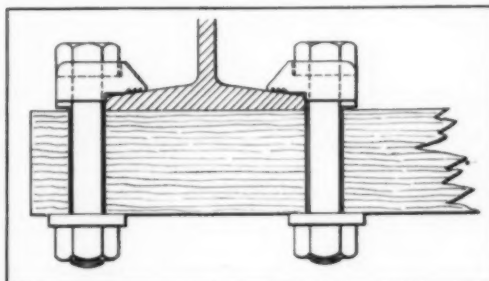
resists chemical action of sweat and grease and will not shrink or stretch. Effective for use by welders, preventing steamed-up, foggy goggles. Holds twenty times its weight of water. Applied after being moistened in water and squeezed out, it stimulates evaporation, with consequent head coolness and comfort. Easily washed and sterilized in boiling water or steam. — **American Allsafe Co., 210 Franklin St., Buffalo, N. Y.**

**GRAVEL SPREADER**, 8-cu.yd. capacity semi-trailer drawn by truck tractor, distributes not only gravel, but cinders, sand and crushed rock. It weighs 5,200 lb., weight reduction having been accomplished by elimination of mechanical lifting device and substitution of special body for conventional heavier dump



body. Unit allows flow of material ranging from 1/2 to 7 1/2 in. without seepage through operation of specially designed discharge gate which can be controlled by hand, vacuum or air and, furthermore, can be cab-controlled, permitting one-man operation. Spread is even and continuous. Although primarily intended for spreading purposes, machine also can be used to advantage for transport hauls in operations where load is to be dumped into hopper. Corner brackets, 8-in. wide, allow installation of top-boards when greater loads of lighter materials are demanded. Equipped with 9.00x20 10-ply dual pneumatic tires, Westinghouse air brakes, main and auxiliary springs, and I-beam axle; electrically welded throughout. — **Fruehauf Trailer Co., Detroit.**

**SAFETY HOOK BOLT HEAD** and deep washer offer means of converting ordinary bolts into hook bolts for numerous applications in construction and industrial fields where suspension from girders, beams



and angles is desired, especially in the erection of concrete forms, without drilling flanges of supporting members. Sizes from 1/4 to 1 in. Illustration shows wood batten fastened to steel girder using two plain bolts with ordinary washers; bolt heads are mounted in recess of safety hook bolt head. — **Fanner Manufacturing Co., Brookside Park, Cleveland, Ohio.**

**BAKER**

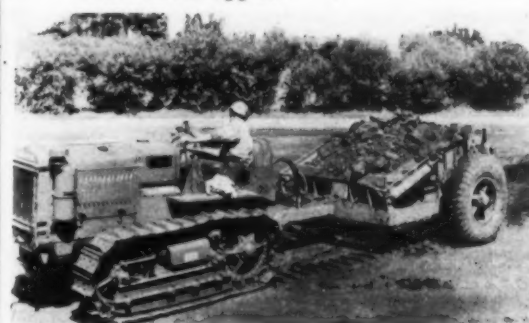
## EQUIPMENT

FOR EARTH MOVING  
AND SNOW MOVING

Whether you want to move dirt or snow, Baker Products with a 30-year record for good performance, are ready to serve you.



Baker Hydraulic Snow Plows are built in 28 models for trucks and tractors in V, one-way and reversible blade types.



Baker Hydraulic Scrapers are made in 2 1/2 and 5 yard capacities with the new flat digging angle for quick, capacity loading.



The many models of Baker Hydraulic Bulldozers with direct lift, down pressure and smooth operation, easily lead the field.

Ask for Bulletins on

- TRUCK SNOW PLOWS ☐
- TRACTOR SNOW PLOWS ☐
- HYDRAULIC SCRAPERS ☐
- HYDRAULIC BULLDOZERS ☐

**THE BAKER MFG. CO.**

568 Stanford Ave.

Springfield, Ill.

# **SPEED UP** JOBS WITH **UNION METAL** *Fluted Monotube*

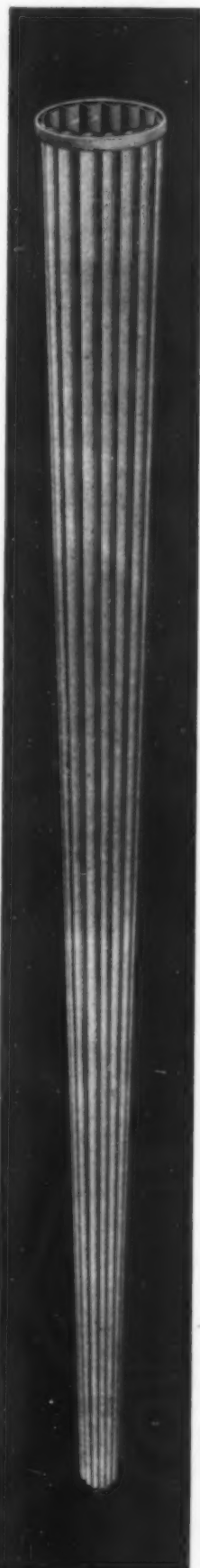
## **PILES ▶**

• Do you want to speed up your piling jobs? Then specify Union Metal Fluted Monotubes. These piles are easier to handle; drive faster; take less blows; and require a minimum of equipment for installation.

The reason? Fluted Monotubes are fabricated by the cold rolling process, which makes possible the use of lighter gauge metal to obtain a pile of greatly reduced weight without sacrifice of strength. You can roll these piles off the car or truck and drag them into position. Drive them without core or mandrel. They have the ruggedness and rigidity to take it. And as for equipment—a mobile crawler crane, leads, and hammer are all you need for a fast, efficient driving operation.

Scores of engineers and contractors have saved time and money by using Fluted Monotubes for cast-in-place concrete piles. Better get the facts. Write for new illustrated catalog containing complete engineering data.

**THE UNION METAL  
MANUFACTURING CO.**  
CANTON, OHIO



# **CONSTRUCTION EQUIPMENT NEWS**

(ALL RIGHTS RESERVED)

## *Review of Construction Machinery and Materials* for NOVEMBER, 1938



**ALL-WHEEL-DRIVE MARSH BUGGY**, for use in swamps and marshes of South and sand and clay of Southwest is combination of extra available power of all-wheel-drive and positive traction and flotation of huge 13.50 x 24 single tires mounted, front and rear, on spoke-type disk wheels. Instead of sinking in soft, marshy ground or sand, Marsh-Buggy is said simply to lie on top and roll across, tires carrying only 8 or 10 lb. of air floating unusually heavy loads. Machine has 135-in. wheelbase and is powered by 85-hp. Ford V-8 motor. — **Marmon-Herrington Co., Inc., Indianapolis, Ind.**



**MORTAR CEMENT** for use in all types of masonry construction comes packed in 70-lb. multi-wall paper bags, each sack containing 1 cu.ft. When sand and water are added mortar is ready for use, no slaking or soaking being necessary. Spreads easily, and is said to be extremely plastic and workable, increasing speed in laying up units. Serves equally well with brick, vitrified tile, stone, hollow tile, concrete and terra cotta units and for stucco. Properly stored, it does not deteriorate. — **Lehigh Portland Cement Co., Allentown, Pa.**

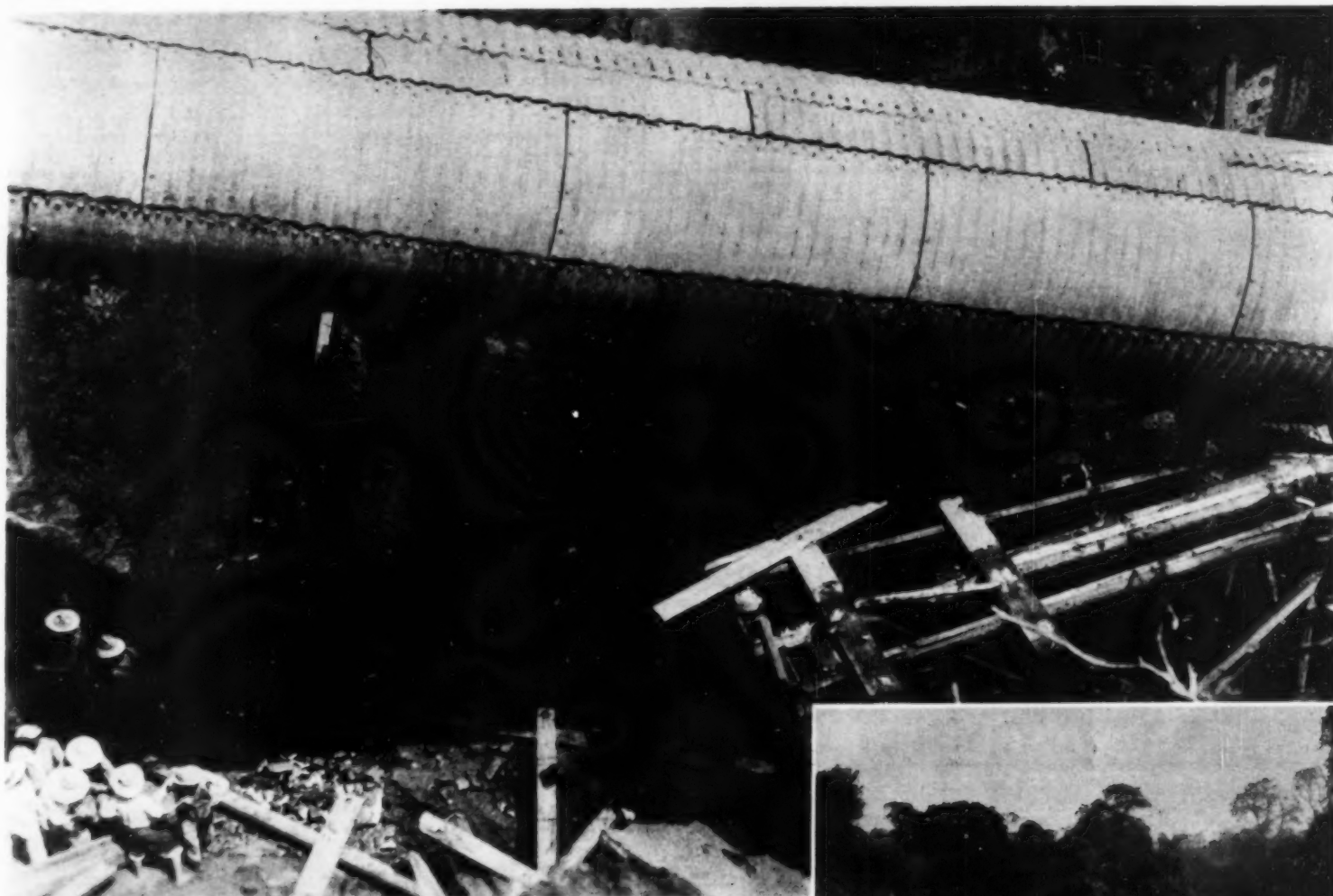
**TILTING-TYPE MIXER**, 3½S "Speedster," features 2½-hp. air-cooled engine housed between drum and axle, making compact unit. End discharge design eliminates need for turning or backing barrows when discharging and is said to be particularly convenient for backing up to foundations, windows or chutes. Machine mounted on spring shock absorbers, Timken bearings and pneumatic tires with detachable towing pole for fast trailing and easy maneuvering. Patented "V" spot drum with cone of Man-Ten steel is mounted on sealed Timken bearings. — **Jaeger Machine Co., Columbus, Ohio.**





# UNDERMINED FOR 70 FEET

**YET IT SAGGED ONLY 2 INCHES!**



## LARGE MULTI PLATE SEWER OUTFALL OK AFTER RECORD CLOUDBURST

• Here is another striking example of money and grief saved by Armco Multi Plate. During the erection of this 97½-inch diameter pipe, a torrent of water gushed down through the ravine, tearing out almost 70 feet of the supporting trestle.

Despite this long span of heavy pipe flowing full of water for several days, it sagged only 2 inches. Moreover, the special water-tight joints didn't leak a drop under this severe test. That's the kind of performance Armco Multi Plate offers you in the design

of large drainage and sewer lines. Write for complete information. Armco Culvert Manufacturers Association, Middletown, Ohio.



## ARMCO MULTI PLATE

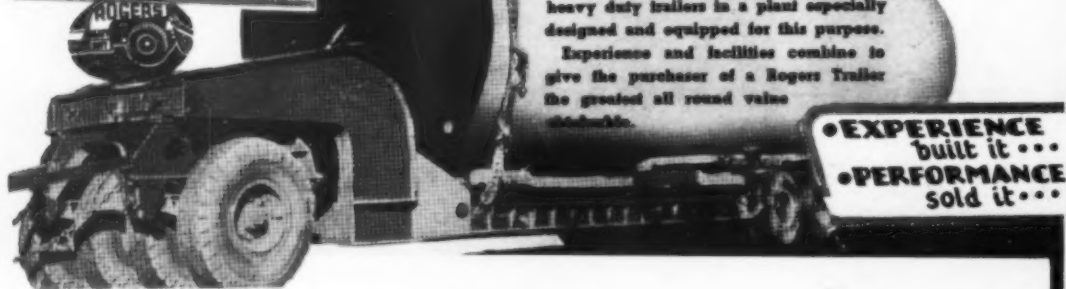
A PRODUCT ORIGINATED AND DEVELOPED BY ARMCO ENGINEERS

November, 1938 — CONSTRUCTION Methods and Equipment — Page 81



## PLUS IN HEAVY DUTY TRAILERS

### VALUES



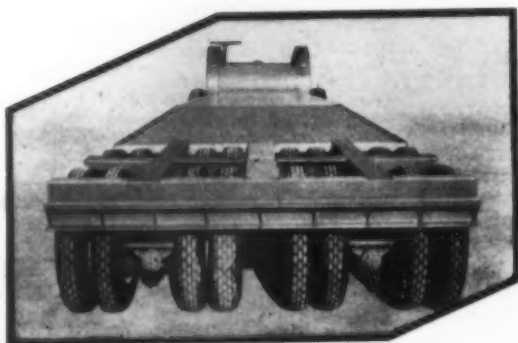
**ROGERS BROTHERS**

do one thing and do that well — build heavy duty trailers in a plant especially designed and equipped for this purpose.

Experience and facilities combine to give the purchaser of a Rogers Trailer the greatest all round value available.

• **EXPERIENCE** built it...  
• **PERFORMANCE** sold it...

*The  
Lighter  
but  
Stronger  
Trailers*



*With the  
Most Efficient  
Brakes  
Ever  
Developed*

Write for the **ROGERS** Catalog

**ROGERS BROTHERS CORPORATION**

135 Orchard Street

ALBION, PENNA.

## ON-THE-JOB PROOF of DEPENDABLE PERFORMANCE



AT CAPE COD CANAL

Three 8-inch G & R self-priming centrifugal pumps make play of draining muddy water on Cape Cod Canal project at Boston.

**MUDDY WATER IS THEIR DISH  
— 24 HOURS A DAY!**

You can bank on it—G & R pumps WILL NOT CLOG—they ASK NO TIME OUT. Let G & R Pumps tell their own story on the job. They will deliver as much (often more) water under any conditions than any other pump. We will ship you one and let you be the judge.

**THE MOST DEPENDABLE PUMPS  
FOR THE LEAST MONEY**

**PROMPT  
DELIVERY  
From  
Stock in 100  
Principal  
Cities**

THE GORMAN-RUPP CO., Mansfield, Ohio

## WANT 10% MORE YARDAGE from your present shovel?



Type HX

Will add 10% or better to yardage of any power shovel (1) by speeding Trip Action (2) Eliminating lost motion (3) Conserving operator's energy.

### • WORKS THIS WAY

Dipper tripping control is part of one of regular operating levers. Operator needn't take hand off lever. A wrist twist trips bucket instantly. Pays for itself in a very short time.

### • AND THAT'S NOT ALL

Will trip a skimmer scoop and a pull shovel — no changes. As a Tag Line Winder on clamshell work gives operator complete control over movement of clamshell, speeds production.

Dipper trip changed to tagline winding by simply changing slack take-up spring, installing longer line.

• **New standard equipment** on the following makes of machines:

Lima Locomotive Works, Inc.—Shovel and Crane Division.

Byers Machine Co.

Speeder Machinery Corp.

Marion Steam Shovel Co.

Browning Crane and Shovel Co.

Most shovel manufacturers will equip their new shovels with this dipper trip and tagline winder on request.

• **Write for full particulars** specifying make, model, size and year of shovel.



Type H



**MORIN MFG. COMPANY**  
166 Race St. Holyoke, Mass.



**TORQUE - INDICATING WRENCH** measures tension of each bolt used in installation of pipe flanges, couplings, cylinder heads on multi-cylinder gasoline and diesel motors and pump and turbine casings where it is necessary to have all bolts drawn up evenly to avoid possibility of leaks. Includes ratchet mechanism that is reversible. Has no dials or gages to get out of order or to be damaged by careless handling. Handle does not swing free when desired torque is reached because ratchet mechanism locks, thus preventing smashed fingers for user. In using wrench, indicator is set at desired torque in foot-pounds by loosening indicator clamping screw, moving indicator to desired position and then tightening screw. Ratchet lever is moved to extreme left of wrench, which is operated same as any other ratchet wrench until lever snaps into neutral position in center. Sharp "click" indicates that desired torque is reached. — **Bonney Forge & Tool Works, Allentown, Pa.**

**BLASTING AGENT**, called "Nitramon" No. 2, a new product slower than regular grade, is particularly adapted for use in soft limestone and as a top load in harder material. Density is great enough to enable it to sink in water holes, and its strength is equivalent to 40 per cent ammonia dynamite. Velocity is 10,000 ft. per second. Packed in cans with black lids and white lettering. Makers claim product will not produce headache from handling. Water resistance is indefinite provided cans remain intact, and blasting agent is non-freezing. — **E. I. du Pont de Nemours & Co., Wilmington, Del.**

**LOW-COST WELDER** said to solve problem of providing smooth, dense, splatter-free, all-position welds formerly accomplished only by most expensive welding sets. Current range of 15 to 125 amp., regulated by G-R "stepless" heat control providing



accurate adjustment with but one simple control. Transformer has 65 lb. core and four large, carefully wound coils containing more than 40 lb. of copper and is capable of day-long operation at maximum load without overheating or deterioration. Operates either on 110 or 220-V. single-phase 60-cycle alternating current. Mounted on rubber wheeled casters and provided with handles. Height 22 in.; width, 14 in.; length, 15 in.; weight, 140 lb. — **Glenn-Roberts Co., Inc., 1009 Fruitvale Ave., Oakland, Calif.**



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## ... Points to Real Performance

Look again . . those two big Galion 'Master Diesel' motor graders (illustrated above) are really doing a neat job of spreading and leveling on this resurfacing operation.

A tough job but operators like the way Galion motor graders are designed and constructed, with an extra margin of strength which results in extra service. They know that Galion graders are equal to the job at hand . . that they give mileage, long wear and low cost per dollar of investment.

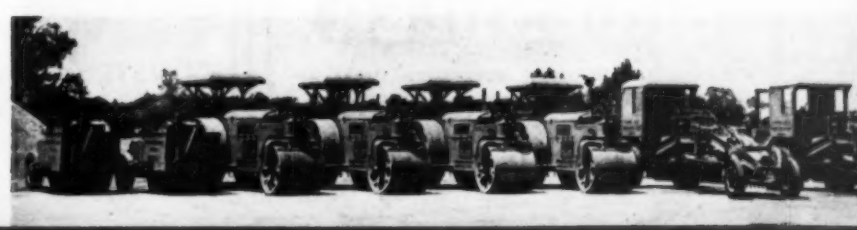
In contributing road machinery which performs as the operator wants, Galion has rendered a service that has found wide response. Others are eliminating worry and the dangerously high expenses of frequent breakdowns by using Galion road machinery. Why not you?



Above—Galion tandem rollers on the Skyline drive in the South. Working in staggered formation these rollers can turn out a lot of work in a day's time. Two different shipments of Galion rollers and graders are shown below.

## The Galion Iron Works & Mfg. Co.

Main Office and Works . . . . . GALION, OHIO  
Export Division . . . . . COLUMBUS, OHIO



## PULL Extra PROFITS YOUR WAY

Handle extra work with this high-speed Michigan Truck Dragline. Fingertip Air-Controls make possible more passes per hour—greater output per day—extra profits at the end of the month. Travels anywhere a truck can go—and with truck economy.

Rugged construction, from-the-ground-up, gives Michigan the stability of heavier equipment and eliminates costly break-downs and expensive schedule interruptions. Write MICHIGAN POWER SHOVEL COMPANY, Benton Harbor, Michigan.



WRITE FOR BULLETINS  
CM and CM2

3/8 YD  
1/2 YD

# MICHIGAN

"Established 1885"

## GRUENDLER

CRUSHERS • PULVERIZERS • GRINDERS

### Road Building — Equipment —



#### Portable Straight Line Rock, Gravel Crushing and Screening Plant

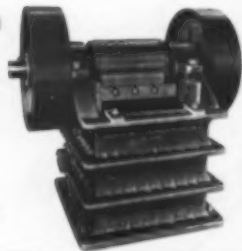
Capacity from 60 yds. to 100 yds. per hour. Underslung frame prevents tipping on slopes.

One Reduction

### JAW CRUSHERS

Greater Production  
at Lower Cost.

No Road Building  
Plant  
can be more efficient  
than its CRUSHER.



Mfrs. of Stationary or Portable Hammer Mill Limestone Pulverizers, Gravel and Rock Crushing and Screening Plants Conveying and Screening Equipment.

## GRUENDLER

CRUSHERS • PULVERIZERS • GRINDERS

GRUENDLER CRUSHER & PULVERIZER COMPANY  
Plant and Offices: 2917 N. Market Street, St. Louis, Mo.

## Cut Those Costs!



with

## CMC EQUIPMENT

• Fast moving — fast  
mixing CMC Non-  
Tilt Trailers in 5s,  
7s, 10s and 14s sizes.



• CMC 4-Wheel Side or  
End Discharge Non-Tilt  
models in 5s, 7s, 10s, and  
14s sizes.



• CMC Dual Prime  
Pumps in capacities from  
1 1/2" up.



• CMC Pneumatic Tired  
Carts and Barrows.

Here's the No. 1 equipment line when it comes to making money. You get efficiency without extravagance—you get stamina without excess weight—you get "top notch" performance in CMC Mixers—Dual Prime Pumps—Hoists—Saw Rigs—Pneumatic Tired Carts and Barrows. Write for catalog and prices.

### CONSTRUCTION MACHINERY CO. WATERLOO, IOWA

COMPOUND WOOD FLOORING, said to be low in first cost, low in installation cost and easily laid by any experienced carpenter, is laminated product



bonded with phenolic resin glue and faced with a 1/4-in. Orham Elm veneer. Made in planks 3/8 in. thick, 12 in. wide and 6 and 8 ft. long. May be laid over any type of wood sub-flooring or put down in mastic. When placed over sub-flooring tongue-and-groove arrangement permits carpenter to toe-nail material to sub-floor. Ends of planks grooved so that 1/4-in. metal strip may be inserted to form a spline with planking that butts against it, assuring a completely smooth surface, forming an airtight and vermin-proof seal and eliminating need for face nailing. This flooring, properly laid, is vermin-proof, termite resistant and is not subject to warping with resultant floor squeaks. — Haskelite Manufacturing Corp., 208 W. Washington St., Chicago, Ill.

AUTOMOTIVE AIR BRAKE, a brake actuation system for quick conversion of manual into power brakes has been made available for use on trucks, trailers and tractors. Consists of an air compressor to be mounted in any convenient location and operated by vacuum available in intake manifold. Compressor builds up reserve tank pressure of 100 lb., comes to dead stop when predetermined tank pressure is reached and immediately replenishes air spent in operating brakes. Foot-valve actually meters air, allowing any desired pressure to be built up in the system for operation of brakes. — Wagner Electric Corp., 6400 Plymouth Ave., St. Louis, Mo.

METAL PORTABLE LAMP GUARD, heavy-duty type, has as outstanding feature patented rubber ring lock which enables workman to replace lamp bulb without tools. Guard is supported inside and out by

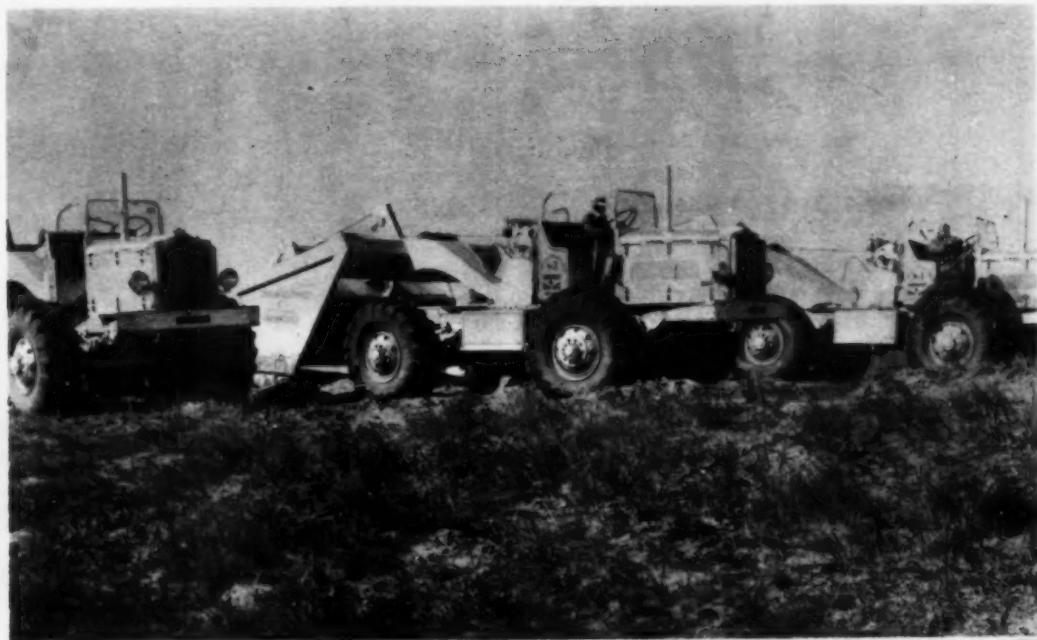


heavy rubber shock-absorbing ring and handle which prevent vibration and shock from being transmitted directly to lamp, thus eliminating filament and lamp breakage. Can be easily and quickly dismantled to enable mechanic to clean lamp and reflector. Handle and ring made of oil and heat resistant Latex rubber. — Safeguard Electric Co., Inc., 1 De Kalb Ave., Brooklyn, N. Y.



PIONEER OF THE NEW LOWER COST EARTHMOVING METHODS

# ***OSHKOSH 4-Wheel Drive Earthmover***



• Utah Construction Co's fleet of Oshkosh 4-Wheel Drive Earthmovers with 16 yard Southwest Scrapers, doing a fine job in sand near Lemoyne, Nebraska.



**The Long Haul Problem Has Been Solved By Oshkosh 4-Wheel Drive Earthmover Methods.**

**Diesel Powered (176 HP) — 4-Wheel Drive — 4-Wheel Power Steer — Maneuverability Similar to Crawler Type Tractor**

The Oshkosh 4-Wheel Drive Earthmover Tractor is a utility tractor. In addition to its outstanding ability with scraper, it is equally efficient for handling rock wagons, and end or bottom dump dirt wagons.

**THE OSHKOSH 4-WHEEL DRIVE EARTHMOVER METHOD RESULTS IN:  
LOWER COST DIRT**

**OSHKOSH 4-WHEEL DRIVE SALES AGENCY**

***Exclusive Selling Agents***

**OSHKOSH, WISCONSIN, U. S. A.**



## ★ *Dependability Plus!*

There's no guesswork  
in a  
**MORETRENCH  
WELLPOINT SYSTEM**

•  
You're sure of a dry  
job every time.

★  
**MORETRENCH CORP.**  
90 West Street New York, N. Y.

## How They Did It

APPLICATIONS OF SMALL TOOLS

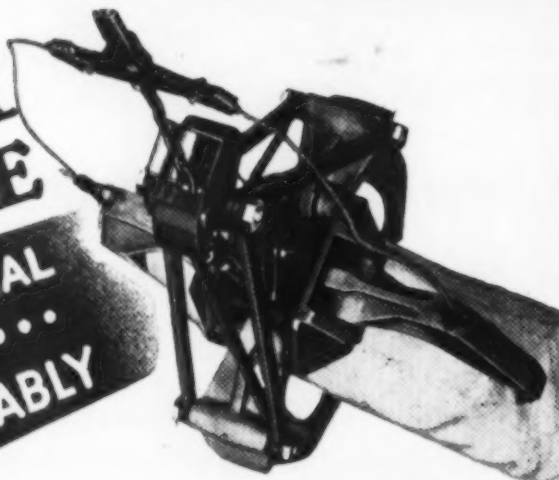
*For Superintendents and Foremen*



**LIGHTWEIGHT WHEELBARROW** is produced by use of aluminum alloy body, effecting weight reduction of 40 lb. Pneumatic tire permits easy operation over soft ground. Sheet Aluminum Corp. offers "Hyb-Lum" wheelbarrow in sizes of 2½ and 4½ cu.yd.

*this*  
**Owen  
GRAPPLE**

**HANDLES MATERIAL  
••• MORE •••  
PROFITABLY**



The New Owen Combination  
Orange Peel Bucket and Grapple

**ALL TIMES GRIP  
REGARDLESS OF THE  
SHAPE OF THE ROCK**

*Write for Literature*  
**THE OWEN BUCKET CO.**  
6020 BREAKWATER AVENUE  
CLEVELAND, OHIO  
Branches: NEW YORK • PHILADELPHIA  
CHICAGO • BERKELEY, CAL.



**BACKBONE CONSTRUCTION** gives shovel longer life. Razor-back shovel made by Union Fork & Hoe Co. is forged with 60 per cent greater thickness up through the center section of the blade and socket to retard wear at cutting edge, strengthen frog and increase stiffness. Blade and socket are forged into one piece.



# Check these **IMPORTANT** **ECONOMICAL FEATURES**



## *Added Resistance to*

- ✓ FATIGUE
- ✓ BENDING STRESSES
- ✓ KINKS
- ✓ ROTATION ON SHEAVES

## *... plus*

- ✓ EASE AND SAFETY IN HANDLING
- ✓ BETTER SPOOLING ON THE DRUM

To the user of wire rope every one of these features means a saving of money. And in EXCELLAY Preformed wire rope you get them all! Think what *that* means in terms of economy. So why not get greater value for your money by specifying EXCELLAY Preformed when ordering wire rope. And if you need technical assistance with any of your problems, our engineers will, of course, be glad to cooperate.

*We also manufacture standard (non-preformed) wire rope.*



**AMERICAN TIGER BRAND**

**EXCELLAY**

REG. U.S.  
PAT. OFF.  
PREFORMED



PAT. OFF.  
WIRE ROPE

**AMERICAN STEEL & WIRE COMPANY**

Cleveland, Chicago and New York

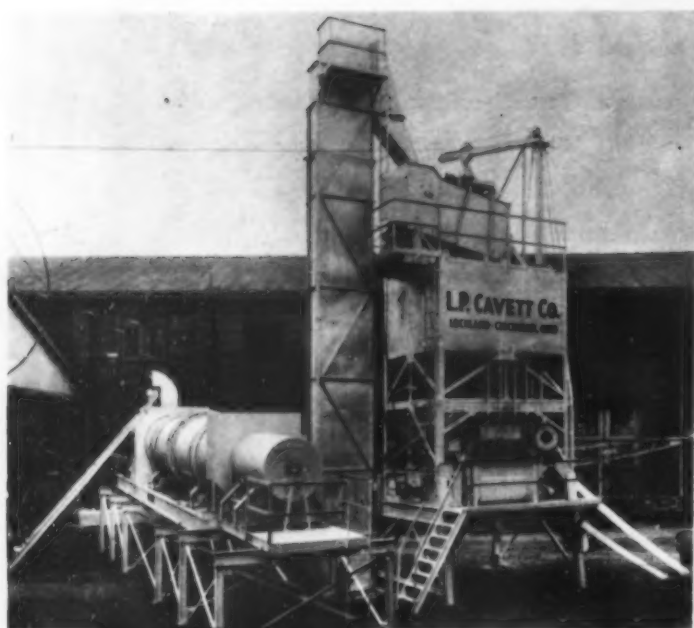
**COLUMBIA STEEL COMPANY**

San Francisco

United States Steel Products Company, New York, Export Distributors



**UNITED STATES STEEL**



MODEL P.A. PLANTS ARE  
BUILT IN 4 SIZES

MODEL PA-15  
1500 = Mixer

MODEL PA-20  
2000 = Mixer

MODEL PA-30  
3000 = Mixer

MODEL PA-40  
4000 = Mixer

## A NEW PORTABLE ASPHALT PLANT

in completely assembled sectional units easily moved by truck

or rail and quickly erected without the use of a crane or gin pole.

Patents applied for

Built in 4 Sizes

Write for Bulletin T-260

### HETHERINGTON & BERNER, Inc.

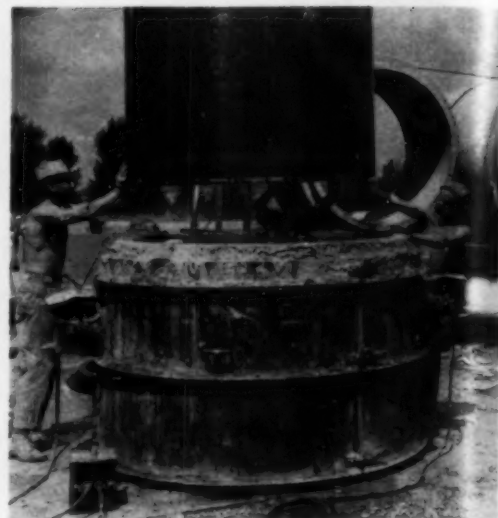
701-745 Kentucky Avenue

Indianapolis, Ind.

## How They Did It

APPLICATIONS OF SMALL TOOLS

For Superintendents and Foremen



PULSATING ELECTRO-MAGNET attached to steel forms vibrates concrete poured for large diameter sewer pipe. Made by Syntron Co., these vibrating units are used by Polaris Concrete Products Co., of St. Paul, Minn.

## Want Daytime Efficiency on that Night Job?



National Carbide V-G  
Light — 8,000 Candle  
Power without extension  
— 16,000 Candlepower  
using extension. Easily  
handled by one man —  
No wires, No carbide  
wasted.

National Carbide V-G  
Handy Light — 1500  
Candle Power — weighs  
only 37 pounds fully  
charged.

National Carbide  
Lanterns — signal of  
red, blue or green —  
ideal for emergencies.

**NATIONAL CARBIDE CORP.**  
LINCOLN BUILDING • NEW YORK

Send information on lanterns or V-G Lights  
with absolutely no obligations.

Name .....  
Address .....  
City ..... State .....

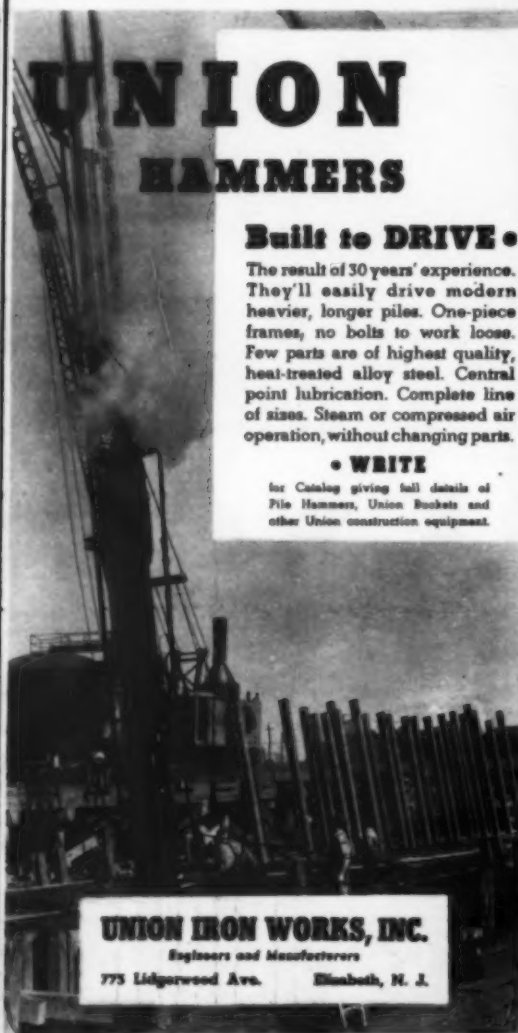
## UNION HAMMERS

### Built to DRIVE •

The result of 30 years' experience.  
They'll easily drive modern  
heavier, longer piles. One-piece  
frames, no bolts to work loose.  
Few parts are of highest quality,  
heat-treated alloy steel. Central  
point lubrication. Complete line  
of sizes. Steam or compressed air  
operation, without changing parts.

### • WRITE

for Catalog giving full details of  
Pile Hammers, Union Buckets and  
other Union construction equipment.



**UNION IRON WORKS, INC.**

Engineers and Manufacturers

775 Lidgerwood Ave. Elizabeth, N. J.



EXTENSIBLE BRACES hold Douglas fir plywood  
sheeting which supports sides of sewer trench in  
Chicago Heights, Ill.



TAPPING MACHINE operated by ratchet handle  
makes hole for service connection in Keasbey &  
Mattison asbestos-cement pipe.



Building an all-welded bridge viaduct with a "Shield-Arc" Welder and "Fleetweld" Electrode.

Repairing a broken tractor frame with a "Shield-Arc" Welder and "Fleetweld" Electrode.

Building up worn dipper teeth with a "Shield-Arc" Welder and "Hardweld" Electrode.



## PROFIT THREE WAYS with "Shield-Arc" Welding

● Contractors equipped with Lincoln "Shield-Arc" Welding have a handy tool that cuts costs three ways. It can *build* special equipment and structures. It can *repair* broken equipment. It can *hard-face* worn equipment.

This triple attack on delays and expense usually gives savings of ten to one hundred times the welding cost.

Here are typical cases:

EQUIPMENT KEPT GOING	DELAY FORESTALLED	PART REPAIRED	REPLACEMENT COST SAVED
Paving Machine	3 days	Gear	\$ 30.15
Rock Crusher	10 days	Mantel	410.00
Tractor	5 days	Sprocket	31.50
Road Scraper	7 days	Frame	62.00
Trencher	Not emergency	Bucket Lips	84.40
Power Shovel	3 weeks	Frame	506.50
Truck	4 days	Crankcase	27.90
Dump Car	Not emergency	Body	143.75
Dragline	10 days	2-yd. Bucket	68.60
Tractor	3 weeks	Frame	350.00
Shovel	10 days	Gear	56.00

### New "Shield-Arc" Welder!

Equipped with Self-Indicating "Job Selector" and Self-Indicating "Current Control." Assures maximum

weld quality and maximum welding speed every time. Consult the nearest Lincoln office or mail the coupon for complete details.

LARGEST MANUFACTURERS OF ARC  
WELDING EQUIPMENT IN THE WORLD

# LINCOLN

THE LINCOLN ELECTRIC COMPANY  
Dept. G-541, Cleveland, Ohio

Send free copy of ☐ The New Lincoln "Shield-Arc."  
☐ Welding in Construction Work.

Name  Position

Company

Address

City  State

**COMPLETE  
WELL POINT SYSTEMS**WILL DRY UP ANY  
EXCAVATION

Faster—More Economically

Write For Job Estimate and 32 page Catalog

**COMPLETE**

MACHINERY &amp; EQUIPMENT CO., Inc.

36-36 11th St., Long Island City, N. Y.

Tel. IRonsides 6-8600



Concrete VIBRATORS and Grinders

Write for Circular on types, sizes and prices

**White Mfg. Co.**

ELKHART

INDIANA

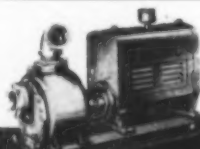
**GRIFFIN  
WELLPOINT SYSTEMS**DRY WET JOBS  
AT A PROFITWrite for new catalog,  
"Pointed Wellpoint Facts"

GRIFFIN WELLPOINT CORP.

725 East 140th Street

New York, N. Y.

Phone: MEIrose 5-7704-5

SIMPLE  
DEPENDABLE  
RUGGED1 1/4" to 10"  
SELF PRIMING PUMPS  
DREDGING AND JETTING PUMPS**Sterling**

MACHINERY CORPORATION

411-115 Southwest Blvd., Kansas City, Mo.

**Giant-Gript Hand Paving Tools**STRAIGHT EDGES — Aluminum or Steel • EDGERS —  
Stamped or Cast Iron • HAND FLOATS — Standard or  
Special • BULL FLOATS and HAND SCREEDS •  
CONCRETE BROOMS of Buss or Bassine.**L. and M. MANUFACTURING COMPANY**

Division of Mondie Forge Company, Inc.

10300 BERA ROAD, CLEVELAND, OHIO

**RENT a New ARC WELDER**Save hundreds of dollars on main-  
tenance with Hobart Welders. No  
loss of time, no new parts to buy.  
Special rental terms for small or  
rush jobs, with one applied on  
purchase price should you decide to  
keep.

30 DAYS TRIAL

On your own work in spare Hobart  
will pay for itself in savings alone.

This Book FREE

THE HOBART WELDER BOOK  
SEND FOR YOUR COPY TODAY

HOBART BROS. CO.

3000 C-118

TROY, OHIO

**Keep Winter Jobs Open**with **Aerol**  
CONCRETE HEATERS  
WATER HEATERS  
SALAMANDERS  
THAWING TORCHES

Send for Bulletin 168C

**AEROIL BURNER Co., Inc.** West New York, N.J.

Chicago - San Francisco - Dallas

**NEW "SEARCHLIGHT"  
Advertisements**must be received  
by November  
25th to appear in  
the December  
issue.Address copy to the Depart-  
mental Advertising StaffConstruction Methods and  
Equipment

330 West 42d St., New York City

**SEARCHLIGHT SECTION****EMPLOYMENT : BUSINESS : OPPORTUNITIES : EQUIPMENT—USED or RESALE****UNDISPLAYED RATE:**

10 cents a word, minimum charge \$2.00.

Positions Wanted (full or part-time salaried em-  
ployment only), 1/2 the above rates payable in  
advance.

(See ¶ on Box Numbers)

Proposals, 40 cents a line an insertion.

**INFORMATION:**Box Numbers in care of New York, Chicago, and  
San Francisco offices count 10 words additional  
in undisplayed ads.Discount of 10% if full payment is made in  
advance for four consecutive insertions of un-  
displayed ads (not including proposals).**DISPLAYED — RATE PER INCH:**1 inch ..... \$6.00  
2 to 3 inches ..... 5.75 an inch  
4 to 7 inches ..... 5.50 an inch  
Other spaces and contract rates on request.  
An advertising inch is measured vertically on one  
column, 4 columns — 36 inches — to a page.

COPY FOR NEW ADVERTISEMENTS RECEIVED UNTIL NOV. 25th FOR THE DECEMBER ISSUE

**REBUILT CONSTRUCTION EQUIPMENT**Air Compressors Material Elevator  
Belt Conveyors Platforms  
Concrete Gasoline Engines  
Vibrators Pneumatic Tools  
Derricks Concrete Mixers  
Elec. Motors & Plaster Mixers  
Controls Mortar Mixers  
Saw Tables Centrifugal  
Elec. Welders Pumps  
Gasoline & Pressure Pumps  
Elec. Hoists Concrete Buckets  
Concrete Buckets Storage Bins**UNITED HOISTING CO., INC.**Serving Construction Industry for 46 years.  
171 Locust Avenue, New York, N. Y.**U. S. GOVERNMENT**TENNESSEE VALLEY AUTHORITY,  
KNOXVILLE, TENNESSEE. Sealed bids, in  
triplicate, will be received until 10 A. M.,  
Central Standard Time, December 28, 1938,  
for the purchase from the Authority of one  
(1) Stationary Cableway for 1270-foot span,  
consisting of one (1) Lidgerwood Cableway  
Steam Hoist, 100 H.P. at 600 R.P.M.; one (1)  
110-foot Tail Tower (less bottom section); one  
(1) 150-foot Head Tower, carriage, miscella-  
neous tower sheaves, fittings, etc.; four (4)  
Concrete Buckets, 2 cu.yd. Blaw-Knox roller  
gates; two (2) Concrete Buckets, 5.6 cu.yd.  
Blaw-Knox roller gates; one (1) Steel Cement  
Bin Blaw-Knox, 500 barrel capacity; and one  
(1) Pumpcrete, Rex Model 200. The cableway  
equipment, concrete buckets and steel cement  
bin are located at Pickwick Dam, Tennessee.  
The Pumpcrete is located at Wheeler Dam,**U. S. GOVERNMENT**Alabama. Inspection may be made at these  
points any time before date of opening bids.  
Bidding documents, for which there is no  
charge, available October 24, 1938, at the  
above office. C. H. Garity, Director of Mate-  
rials Department (1).**LEGAL NOTICE**STATEMENT OF THE OWNERSHIP, MANAGE-  
MENT, CIRCULATION, ETC., REQUIRED BY THE  
ACTS OF CONGRESS OF AUGUST 24, 1912, AND  
MARCH 3, 1932.OF Construction Methods and Equipment published  
Monthly at New York, N. Y., for October 1, 1938.  
State of New York  
County of New YorkBefore me, a Notary Public in and for the State  
and county aforesaid, personally appeared D. C.  
McGraw, who, having been duly sworn according  
to law, deposes and says that he is the Secretary of  
the McGraw-Hill Publishing Company, Inc., pub-  
lishers of Construction Methods and Equipment, and  
that the following is, to the best of his knowledge  
and belief, a true statement of the ownership, man-  
agement (and if a daily paper, the circulation), etc.,  
of the aforesaid publication for the date shown in  
the above caption, required by the Act of August 24,  
1912, as amended by the Act of March 3, 1932, em-  
bodied in section 537, Postal Laws and Regulations,  
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Publisher, McGraw-Hill Publishing Company, Inc.,  
330 West 42nd Street, N. Y. C. Editor, Robert K.  
Tomlin, 330 West 42nd Street, N. Y. C. Managing  
Editor, None. Business Managers, Albert E. Paxton,  
330 West 42nd Street, N. Y. C.2. That the owner is: (If owned by a corporation,  
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Fifth Avenue, N. Y. C. F. S. Weatherby, 271 Clin-  
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ison, N. J.3. That the known bondholders, mortgages, and  
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or more of total amount of bonds, mortgages, or other  
securities are: (If there are none, so state.) None.  
4. That the two paragraphs next above, giving the  
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ers, if any, contain not only the list of stockholders  
and security holders as they appear upon the books of  
the company but also, in cases where the stockholder  
or security holder appears upon the books of the com-  
pany as trustee or in any other fiduciary relation, the  
name of the person or corporation for whom such  
trustee is acting, is given; also that the said two  
paragraphs contain statements embracing affiant's  
full knowledge and belief as to the circumstances and  
conditions under which stockholders and security  
holders who do not appear upon the books of the  
company as trustees hold stock and securities in a  
capacity other than that of a bona fide owner; and  
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securities than as so stated by him.5. That the average number of copies of each  
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the mails or otherwise, to paid subscribers during  
the six months preceding the date shown above is:  
(This information is required from daily publications  
only.)D. C. McGRAW, Secretary  
MCGRAW-HILL PUBLISHING COMPANY, INC.**LEGAL NOTICE**Sworn to and subscribed before me this 26th day of  
September, 1938.  
(Seal) H. F. BEHRNE,  
Notary Public, Nassau County, C.K.'s No. 84, N. Y.  
C.K.'s No. 98, Reg. No. 0-B-90.  
(My Commission expires March 30, 1940.)**YOU ARE ONE...**of 20,000 readers of CONSTRU-  
TION METHODS and EQUIP-  
MENT. Your problems of field op-  
erations associated with building  
and engineering construction—busi-  
ness or individual — are duplicated  
with other readers BUT—Still OTHER readers can provide  
the solution of your problem if they  
know what it is!Tell them! Here! Through classified  
advertising in the Searchlight Sec-  
tion of your business paper and  
theirs.



# ANNOUNCEMENT

The 1939 Road Builders' Number of CONSTRUCTION Methods & Equipment will be published in February instead of January . . . The issue will be in the mail three weeks before the opening of the 36th annual convention of the American Road Builders' Association, which will be held concurrently with the convention of the Associated General Contractors of America in San Francisco, March 7 to 10.

## Your name stamped on these books **FREE**

At no additional cost to you, we will stamp your name or a friend's name, in gold on the front cover of any copy of Underwood's *Estimating Construction Costs* and *Standard Construction Methods* ordered from this advertisement. This is a special Christmas offer, limited to acceptance before January 1, 1939.

### Estimating Construction Costs

630 pages, 6 x 9, 443 charts, 36  
illustrations, flexible, \$6.00



**T**HIS book provides a simple chart system that gives construction costs at a glance and takes long and tedious headwork out of estimating. Over 400 of the charts are given in ready form for handy use, and cover the estimating of transportation, labor and material costs for all kinds of construction work. The book also presents a complete model estimate for a typical small building, together with a step-by-step description of the methods followed in making it.

### Standard Construction Methods

SECOND EDITION  
490 pages, 6 x 9, 422 illustrations,  
flexible Keratol, \$5.00



**H**ERE is a manual of actual construction methods—methods that are used every day by practical engineers, superintendents and others upon whom rests the responsibility of getting things done. It covers construction methods thoroughly—from first steps in organization and equipment to pipe work and painting—from excavation and pile driving to roofing and plastering.

Do you want to make a friend a gift combining personal thoughtfulness with real utility? Do you want a copy of these books that you will doubly prize? Then take advantage of this free stamping offer. Send the coupon today. (Proper remittance should be enclosed with order and, of course, stamped copies are not returnable.)

#### SPECIAL HOLIDAY OFFER COUPON

McGraw-Hill Book Co., Inc., 330 W. 42nd St., N. Y. C.  
Send me

- ☐ Underwood—Estimating Construction Costs, \$6.00
- ☐ Underwood—Standard Construction Methods, \$5.00 according to the terms checked below:
- ☐ With name stamped in gold. I enclose payment for book(s) and understand stamped books are not returnable. (Offer expires Jan. 1, 1939.)
- ☐ For 10 days' examination; without gold stamping. In 10 days I will pay for the book(s), plus a few cents postage and delivery, or return them postpaid. (We pay postage on orders accompanied by remittance.)

Print name to be stamped here.

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Signature .....

Home Address .....

City and State .....

Name of Company .....

Occupation .....

(To insure prompt shipment write plainly and fill in all lines.)

CM-11-38

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November, 1938 — CONSTRUCTION Methods and Equipment

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YOU CAN HANDLE  
SUCH JOBS AS THESE

Digging basements  
Loading trucks from gravel  
piles and stockpiles

Excavating ditches

Backfilling around foundations  
and buildings

Grading highways

Refueling

Clearing woods

Building and maintaining  
dikes, levees, and ditches

Grading around bridges

Grading excavations

Grading around ditches

Grading around

Clearing up around yards

Clearing brush

Grading along pits

Removing brush

Grading and maintaining  
loading ramps and roads

Stockpiling

Grading and maintaining  
highway and railway  
shoulders

Grading around buildings

Grading around foundations

Grading around

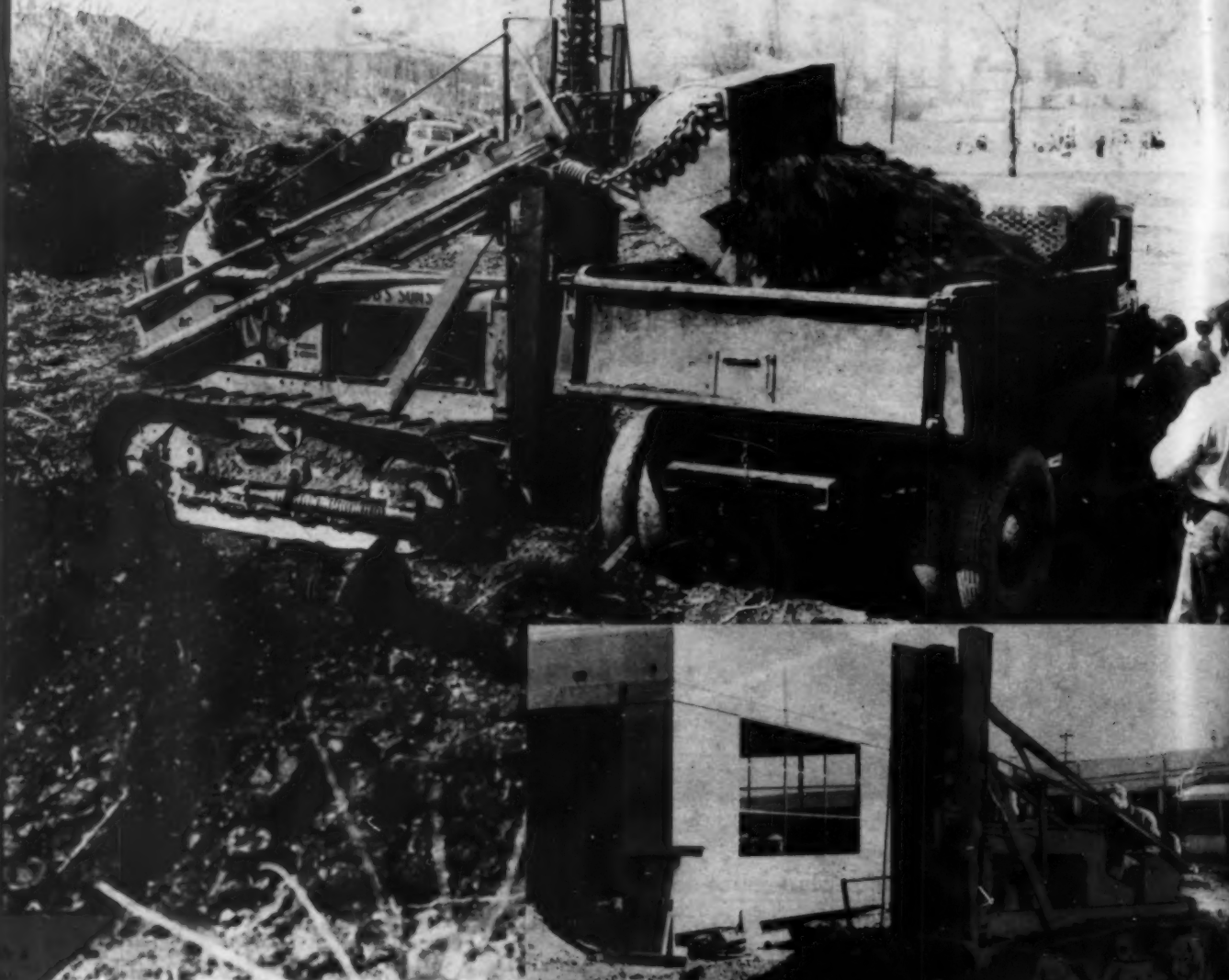
Grading around

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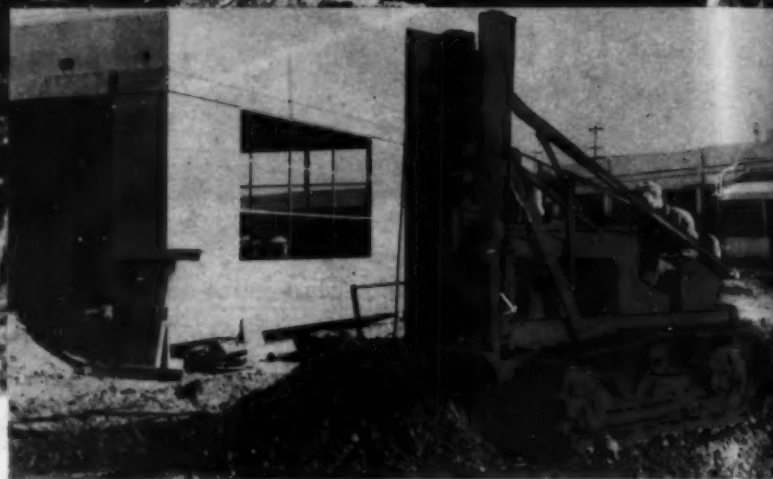
**Opening the way for a New Street—**  
Wm. Shaub's Sons demonstrate that heavy  
brush and roots are no bar to the use of the  
WM and Hough loader as they excavate for  
a new street in Lancaster, Penn.

The combination of WM tractor and Hough loader is a fast-moving, powerful digging and loading unit. Bucket has full  $\frac{1}{2}$ -yard capacity. Working in solid dirt, clay or gravel, it will dig and load into trucks at the rate of 30 to 40 cubic yards an hour. Working from stockpiles it loads 40 to 50 yards hourly. Bucket may be removed and replaced with a backfiller blade or snowplow. Change to backfiller can be made in less than ten minutes; to snowplow, in less than fifteen minutes. Drawbar always free for pulling purposes. Easily and quickly towed from one job to the next on its own transport wheels. This outfit speeds up your entire job by handling the many extras that are always coming up—handles them in a hurry, practically eliminates slow handwork and saves moving heavy, expensive equipment.

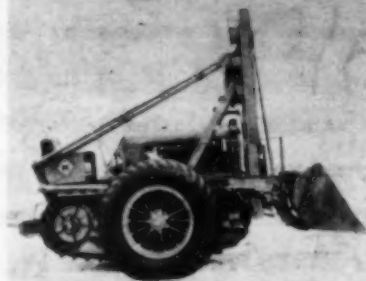
Ask your Allis-Chalmers dealer to demonstrate how the WM and Hough loader can shave costs on your jobs.

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TRACTOR DIVISION—MILWAUKEE, U. S. A.



**Backfilling on a Building Job—**  
Here W. H. Talbot, West  
Coast Contractor has  
replaced the shovel bucket with  
a backfiller blade and does a  
quick job of cleaning up  
around a new building.



**On Transport Wheels—** With  
wheels in place the over-all  
width is only 95 inches, well  
within all state highway re-  
quirements. No jacks are re-  
quired for either mounting or  
dismounting.



**Wider Shoulders for a Railroad—**  
This WM and Hough loader,  
owned by the Missouri Paci-  
fic R.R., takes dirt from the  
right-of-way on either side of  
the tracks and carries it up  
onto the shoulders, thus mak-  
ing a quick, easy job of  
widening those shoulders.